Vol. LV.
New Series Vol. 8, No. 5.

AUGUST, 1919.

$3.00 per annum
Foreign, $3.60; Canada, $3.25
Single Copies 30 cts. in U. S.

JOURNAL
OF THE
American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Ass'n)
EDITED AND PUBLISHED FOR
The American Veterinary Medical Association
by W. H. Dalrymple, Baton Rouge, La.

CONTENTS

EDITORIAL.....495

PAPERS, ETC.:
Vibrionic Abortion—Sir S. Stockman.....499
Abortion Disease of Cattle—W. E. Cotton.....504
Veterinary Training for the Army—P. A. Fish, Chairman.....528
Chronic Pox-Like Infection in Goats—R. V. Stone and C. W. Fisher..536
Studies on Anthelmintics—M. C. Hall, M. J. Smead and C. F. Wolf...543

CLINICAL AND CASE REPORTS:
Verminous Cattle—E. Horstman.....550
Stercoremia of Sheep—E. A. Bruce.....553
Delayed Bovine Delivery—J. A. Waugh.....558
Silicate of Soda in Broken Limbs—J. A. Waugh.....558
Scrotal and Preputial Edema—O. W. Barrett and R. W. Shufeldt....559
False Hermaphrodism in Native Phillipino Horse—O. W. Barrett and R. W. Shufeldt.....560-561

ABSTRACTS.....562

ARMY VETERINARY SERVICE.....574

ASSOCIATION NEWS:
American Veterinary Medical Association:
Committee on Legislation.....585
Facts About Louisiana and New Orleans.....586
Committee on Legislation.....594
Other Associations.....595

COMMUNICATIONS.....610

NECROLOGICAL.....611

MISCELLANEOUS.....612

The Journal of the American Veterinary Medical Association is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances should be addressed to Journal of the American Veterinary Medical Association, Baton Rouge, La. Matters pertaining to the American Veterinary Medical Association and Membership should be sent to Dr. N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Ill.

Entered as Second Class Matter, October 26, 1918, at Baton Rouge, La., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized October 26, 1918.

JOURNAL
OF THE
American Veterinary Medical Association
FORMERLY AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Ass'n)
W. H. DALRYMPLE, Editor. BATON ROUGE, LA.

VOL. LV, N. S. VOL. 8 AUGUST, 1919. No. 5

ANÆSTHESIA IN VETERINARY PRACTICE.

Before this article appears in print, it is possible that a bill will have passed the British Parliament requiring the use of anæsthetics in veterinary practice in Great Britain.

In fact it seems a little strange that, ere this, such a law had not been in force over there, considering the greater age of the profession and the position it holds among the other so-called learned professions, notwithstanding the fact that some of our confreres in the "tight little island" seem to continue to deplore the lack of proper recognition by those in authority.

No doubt anæsthetics are being used much more generally by the profession than in former days, but there is still room for their wider application everywhere, and we know that their greater use in operations, where they are not now employed, would not only aid in the relief of unnecessary suffering in patients under surgical procedure, but raise the status of the profession in the eyes of, not so much the fanatic, if we will, but of sensibly-humane and right-thinking people; for we observe, from some of our British exchanges, that among the members of Parliament who discussed the bill referred to, and were in favor of

its passage, were men of broad vision with reference to such matters, were friends of the veterinary profession, and who seemed to be surprised that some such law had not already appeared on the statute books.

If such a law is thought necessary, in the cause of humanity, in another country, it is surely required in the various states of our own, when one considers the barbarities that are too often practiced under the guise of surgery.

True, many of our professional men practice anæsthesia, either local or general, when its employment is necessary, but there are still too many who do not; and there is the great army of licensed non-graduate men and empirics who probably rarely or never think of it. Doubtless there are difficulties in the way of the enforcement of such a measure in any country, and which might be said to be intensified in our own on account of peculiar conditions. However, the sooner the matter is agitated and brought before the minds of the profession and the stock-owning public in the various states, the sooner will relief come, and much unnecessary animal suffering prevented; remembering that one, if not the first, law of surgery is the relief of pain.

In the cause of humanity, therefore, we commend those of our British confreres who favor the passage of their Anæsthetics Bill, there being many of them no doubt, and we trust that we, in this country, may, ere long, be guided and benefited by their example by having some such humane law passed in each state, and enforced, so far as that is practicable.

SHALL WE PROFIT BY THE EXPERIENCES OF THE LATE WAR?

The trite saying that "it is an ill wind that blows nobody any good," may, we believe, be applied, in a measure at least, to conditions which we hope may result from the recent world conflict, costly as the struggle has been in both life and treasure. The splendid efforts which were put forth for the conservation of life, both human and animal, and the gratifying results obtained, is sure to have a most salutary effect on the practice of both human and veterinary medicine and surgery in the future; and the experiences gained on the battle fronts of Europe have afforded opportunity, as never before, which will doubtless be taken advantage of by both branches of the medical profession in the

peace times that are to follow, which the world, generally, will get the benefit of. Such progress as has been made in medicine and surgery, during the few years of conflict, could not have been thought of, much less accomplished, under ordinary peace conditions; and it is to be hoped that the advantages gained will not be lost sight of, but form a stimulus to greater effort in the future for the benefit of the profession, and for those who are dependent on it for the saving of animal life and the relief of animal suffering.

In addressing the General Surgical Meeting of the A. M. A., recently at Atlantic City, Dr. Ernest W. Hey Groves, of England, made the statement that—

> "No subject reduced us to such despair in the early days of the war as fractures. I may equally say that in the latter days of the war perhaps no subject has been more satisfactorily dealt with. That improvement was due, not to the genius of any one man, or to the invention of any one apparatus, but simply to the principles of coöperation, continuity and team work."

If this was the case with the medical corps, we have no doubt that the same may be said with reference to the veterinary; not perhaps with regard to fractures, but certainly with wounds, and doubtless with other conditions, found obstinate at first, but which afterwards responded to treatment which experience, "coöperation and team work" found to be satisfactory. One would not expect to find anything else than coöperation and team work under military conditions in the field.

However, now that the war is over and the members of our American Veterinary Corps are returning to civil life and practice, the valuable lessons learned during the days of hostilities should not be forgotten, but carried into everyday practice, bearing in mind that the profession, generally, would be better off if a little more coöperation was indulged in by its members.

A further benefit we believe the profession will have gained as a result of the war will be the much closer international relationship which will accrue from the mixing together, and companionship, of members from the different countries engaged in the strife. This, of itself, is a condition very much to be desired, as it is somewhat rare to find representatives of the profession in different parts of the world who really know, and appreciate, each other's worth as professional men. The fraternization among members of the profession which the war has

afforded should go a long way to remove such misunderstanding, and bring about greater sympathy and true fraternalism.

Another beneficial result we believe will be that our Government will be brought to realize more fully the advantage of a trained Army Veterinary Corps, which they cannot fail to do if they will but familiarize themselves with what this branch of military service accomplished for the different countries, our own included, in the conservation of life and usefulness among the animals at the fighting fronts.

So that while all deplore the terrible catastrophe of the late struggle, now fortunately at an end, let us hope that the future may be the gainer, if only we will endeavor to profit by the experiences obtained during active hostilities, and will put them to useful service in the "piping times of peace."

SCIENTIFIC FEEDING.

To supply food in the right proportion to meet the various requirements of the animal, without a waste of food nutrients, constitutes scientific feeding. It is by carefully studying the composition of feeding stuffs, the proportion in which they are digested by different animals and under different conditions, and the requirements of animals for the various food nutrients when at rest, at work, giving milk, producing wool, mutton, beef, pork, etc., that the principles of feeding have been worked out. In applying these principles in practice the cost and special adaptations of different feeding stuffs must, of course, be taken into account.—*Weekly News Letter.*

Dr. Charles Thigpen is now located in Anniston, Ala.

Drs. E. B. Haskin and Elmer Lash of Jackson, Miss., have reported in person to the Chief of the Bureau, Washington, D. C., for duty in the tuberculosis division.

Dr. E. L. Reed has resigned his position as manager of the Hog Cholera department of H. K. Mulford & Co., and has accepted a position with the Florida State Live Stock Sanitary Board on hog cholera control and inspecting and testing hog cholera serum and virus at Chipley, where the only serum laboratory in Florida is located.

VIBRIONIC ABORTION.

By Sir S. Stockman,
Board of Agriculture, London, (Eng.).

This disease was first described by the writer working in collaboration with Sir John McFadyean for the Departmental Committee appointed by the Board of Agriculture and Fisheries of Great Britain to inquire into Epizoötic Abortion. A full official report of the investigation was published in 1913.[1]

The present article does not attempt to give a complete account of the investigation, which occupied a period of several years, but it is hoped that it may prove of interest to some of the writer's American colleagues from whom he has recently received inquiries regarding the causal micro-organism and the method of its cultivation in the laboratory. The subject, moreover, acquires a further interest owing to a recent publication by Dr. Theobald Smith. [2]

Species of Animal Susceptible to the Disease.

The disease was first discovered amongst ewes, and there is little doubt that this species is the most commonly affected in Great Britain; it appears also to be the most susceptible to experimental infection.

Only three outbreaks of the disease in cows have been met with in Great Britain amongst the many thousand outbreaks of abortion in cattle which have been inquired into. It would appear to be a disease of rare occurrence in cattle, though this may be open to another explanation, viz: that infected cows do not usually abort. Experimental infection in pregnant cows does not usually cause abortion, but a few positive results have been obtained. Positive results were also obtained experimentally in the goat and the guineapig.

Character and Symptoms of the Disease.

Vibrionic abortion assumes enzoötic characters, being confined to certain farms, and showing no great tendency to become epizoötic, as in the case of bovine abortion. Amongst sheep on in-

[1] Part III, Abortion in Sheep. Cd. 7156 and Appendix to Part III, Cd. 7157. Messrs. Wyman and Sons, Ltd., 28, Abingdon St., London, S. W., and Agencies of T. Fisher Unwin in the British Colonies and the United States of America. Price, sevenpence.

[2] Spirilla Associated with Disease of the Fœtal Membranes in Cattle. Jour. Exp. Med., XXVIII. 1918.

fected farms it may apparently disappear almost entirely for several years, and break out again periodically with appalling losses. It is still a question whether the infective agent during the years of latency persists on the pastures as a saprophyte, or in the organs of certain members of the old stock which act as carriers. (See Report.) The symptoms in ewes are primarily those of premature parturition, but some of the animals show a sanguineous, mucoid, discharge from the vulva days or even weeks before abortion occurs. In experimentally infected ewes this discharge sometimes appeared a few days after infection. Vibrios can be found in the discharge, but it does not always happen that actual abortion takes place, although vibrios may undoubtedly have invaded the uterus, caused a certain amount of catarrh, and passed through the os uteri with the discharge. When abortion takes place the fœtus is usually dead and putrid. Septic metritis is a not infrequent sequel. In the experimental animals the intervals between infection and abortion varied from 13 to 113 days, and it is probable that this also applies in practice. On the farm the usual history is that a few lambs were aborted in the early stages of the pregnant season, but the appalling losses appeared with almost dramatic suddenness about six weeks before normal lambing time. Forty to fifty per cent of the lambs may be lost.

Post Mortem Appearances.

Specific lesions are not found in organs other than the uterus, but the pelvic tissues may be hæmorrhagic owing to bruising caused by efforts to expel the fœtus. The uterus may be normal externally or it may show considerable œdema in the region of the neck. Internally the mucous membrane may show little alteration except a mucoid catarrh in the early stages. In later stages the membrane is congested and shows livid patches. Between the mucous membrane and the fœtal envelopes a variable amount of exudate is found, if the examination is made before abortion occurs. The exudate is usually watery in consistence, of a reddish colour and contains flockules of greyish mucus. From the surface of the cotyledons a milky juice can be squeezed out, and in this, as in the exudate, vibrios can be found. Some of the separated cotyledons may present a strikingly anæmic appearance, as in the case of bovine abortion. The fœtus may be well-formed and covered with wool, or it may be small, woolless, dark red in colour, and even pulped up in the membranes.

Even a well-developed fœtus may show a red œdematous fluid in the abdominal wall and peritoneal cavity, and vibrios may be found in the œdema and in the contents of the stomachs. If putrefaction has supervened the appearances are altered accordingly, and the stench is foul.

The Virulent Material and Its Dissemination.

The contents of the infected uterus, the fœtus, and its membranes, are virulent. The virulent material is spread about the pastures by infected ewes long before they show outward signs of going to abort.

Methods of Infection.

The disease can, of course, be conveyed experimentally by inoculation, but that is not a natural method. Experiments at the laboratory, however, showed that animals could also be infected by the natural passages, the alimentary tract, and vagina, particularly the former. One very practical experiment was carried out in this connection. Infected ewes were pastured in a clean grass paddock at the laboratory, and two of them at least were known to have discharged vibrios, 14 and 40 days before two other clean but pregnant ewes were moved in. These two ewes aborted 40 and 46 days after coming on to the paddock, and vibrios were found in the discharges and membranes, and in a fœtus.

Morphological and Staining Characters of the Vibrio.

When examination is made of preparations from natural material stained with fuchsin, methylene blue, or gentian violet, the vibrio is seen as single elements shaped like the letter S or a comma. There may be two or more joined end to end forming a spiral, but very long filaments are only found in old cultures. It is frequently noticed that a more densely staining area in the form of a round dot appears at one end of the comma-like elements. The vibrios are decolourised by Gram's method. In old cultures, especially in those which have been successful on the surface of solid media, there are very long filaments made up of comma-like elements, and it is by transverse division that multiplication seems to take place. In old cultures many of the vibrios have a granular appearance, and innumerable round granules are found free in the medium. These granules stain best by toluidin blue 1%. Viewed by dark ground illumination

the vibrios from a liquid culture are actively motile, and the comma-like elements can be seen shooting off from filaments.

Physical Requirements for Culture.

Under strictly anærobic conditions no growth is obtained. The vibrio, however, does not grow in a free supply of air; in the substance of solid media which has been liquified, sown, and then quickly cooled by placing the tubes in cold water, the growth appears below the surface. It will grow at room temperature, though slowly. The most suitable incubating temperature is 35°-37° C. Liquid cultures are destroyed by a temperature of 55°-57° C. maintained for ten minutes.

Filterability.

The granules pass through the Berkefeldt filter V, but no growth has been obtained from the filtrate.

Cultures.

Provided natural seed material be used, such as mucous exudate from the uterus or fluid from the fœtal stomach, it is easy to obtain a first growth on any of the ordinary media including peptone broth. As regards the solid media, however, this does not apply to smear preparations on the surface of sloped tubes.

Broth.

When sown with natural seed material and incubated at 37° C., growth is evident in from 24 to 48 hours. The natural exudate or tissue used for sowing seems to supply the necessary deoxygenater. On shaking up a tube the growth shows as a vibratory greyish cloudiness. Sub-cultures from broth tube to broth tube usually fail. If, however, a small portion of raw potato be added to the broth tubes and sterilized in the autoclave, a liquid medium is obtained in which cultures can be kept up in series. The writer has used this medium for many years for culturing bacteria, such as this vibrio and the bacillus of swine erysipelas, which seem to prefer an atmosphere slightly attenuated as regards oxygen. The potato seems to act like tissue in the now well known Tarozzi method, but in a less, and in this case more favourable degree.

The surest method of keeping up cultures in series is to sow with several drops of a liquid culture containing potato agar tubes which have been liquified and cooled to 45° C. They are then solidified by plunging into cold water. After ten days' in-

cubation when colonies are evident, a portion of the agar containing the growth is scooped out with a sterile platinum scoop, and transferred to a potato-broth tube. By alternating the medium every ten days in this way from liquid to solid and vice versa, the writer has had no difficulty in keeping his original cultures running for over ten years.

Agar.

Most frequently no growth occurs on the surface of slopes. When growth does take place it is in the form of a very thin grey film. If the agar be sown when liquid and then sloped or plated (not above 45° C.) innumerable brownish colonies like specks of bran appear just under the surface. If the agar be sown when liquid and then cooled quickly in the upright position growth takes place at first about one-third to one-quarter of an inch below the surface, and later it shows itself just below the surface, probably having made its attenuated atmosphere by absorbing oxygen. The growth in the deeper zone begins as a grey cloudy ring. After about a month many of the colonies are from a pin-point to a pin-head in size, the large ones having a reddish-brown colour. Sometimes large isolated red colonies appear deep down in the medium. Fairly good plate cultures may be obtained on agar which has been made by using potato-broth instead of meat broth. This medium is put up in flat bottles which are heavily sown on the surface with a liquid culture, and incubated in a rarefied atmosphere.

Gelatin.

If a liquid culture is richly sown on liquified gelatin which if afterward solidified, the growth is slow, as the medium cannot be kept solid at an incubating temperature. It begins to show as a greyish cloudiness in about ten days, and a ring is formed about half an inch below the surface. It does not extend upwards.

Blood Agar Slopes.

This is the best method of obtaining surface growths, but it is not always successful. Grown in this way, however, the vegetating power of a seemingly enfeebled strain often seems to have become reënforced when transferred to other media. On the surface of blood-agar the vibrio grows as a greyish film which often becomes fairly dense. It may also appear as round globular colonies of a grey colour. In old cultures on this medium some of the filaments attain an enormous length, and granules

are very abundant. To obtain a somewhat dense emulsion for purposes, such as the agglutination test, several liquid cultures (if in potato broth they should be first filtered through paper) should be centrifuged, and the deposit of vibrios diluted to the requisite degree.

Observations regarding the agglutinating value of the serum of infected animals on the vibrio were made, some of which are recorded in the Appendix to the Departmental Report. It would appear that specific agglutinations develop in the blood of affected animals, and that the test is a valuable aid to diagnosis. It is also valuable as a means of determining whether an animal has aborted from infection by the vibrio or by the bacillus of bovine abortion.

ABORTION DISEASE OF CATTLE.*

W. E. COTTON,
Bureau of Animal Industry Experiment Station, Bethesda, Md.

I am fortunate in being assigned a subject which I am sure will interest you, whose duty and privilege it is to help guard the great live stock industry of the country against loss through disease. The subject is of unusual interest at this time, because a world shortage of cattle and of most everything else makes the need for preventing waste probably greater than ever before.

With the exception of tuberculosis, infectious abortion probably causes greater losses to the cattle industry of this country than any other disease, and it is even a question whether tuberculosis can be excepted. Of all the great plagues that affect our cattle industry, it is perhaps the least understood. In the short time which we have, I shall try to discuss the more important known facts and their application to the control of the disease.

It is now generally conceded that the abortion bacillus of Bang is responsible for most of the abortions of a contagious nature. Other causes no doubt are at times responsible for abortions, but these probably play a minor part in the abortion question. In this connection it is well to mention the recent work of Dr. Theobald Smith (Journal of Experimental Medicine, Vol. XXVIII, No. 6).

Dr. Smith reports, that from 41 cases of abortion in a group of herds under one management with more or less intercourse be-

* A lecture delivered to the veterinarians of the State of Indiana through the Agricultural Extension Service of Purdue University.

tween herds, he recovered B. abortus from 27 and a spirillum from 14, and that in no instance were both organisms found in the same animal. He concludes that the organisms are mutually exclusive. He asserts that, like B. abortus, the spirillum requires reduced oxygen pressure for its growth, and that it seems to have the same characteristics as the vibrio of ovine abortion described by McFadyean and Stockman in 1913 (Report of Departmental Committee of the Board of Agriculture and Fisheries on Epizoötic Abortion, Part III, Abortion in Sheep), but that the question as to whether the two organisms are identical has not been answered.

Because of the publication of the above work, it may be interesting to record that Drs. Buck and Creech of the Bureau of Animal Industry, Division of Pathology, have informed me that in the year 1918, on the following days, January 5, March 11, and December 30, they isolated a spirillum or vibrio in pure cultures from the aborted fetuses of four cows. Abortion bacilli were found to be present in the uterine material of one of these cows and in the milk of another soon after they aborted. All of the cows reacted to agglutination tests for abortion disease, and two of them had acquired the reactions since the beginning of the pregnancy that was terminated by abortion. Drs. Buck and Creech do not claim that they have traced any real etiological relationship between the spirillum or vibrio and the abortions with which they were in some way associated; on the other hand, they believe that the exclusion of the abortion bacillus as a possible causative agent in the few cases investigated, did not appear to be justified. In Dr. Smith's article, no report of tests of the blood of the animals under observation is made, and what such tests might have revealed is questionable.

McFadyean and Stockman report that they were able with some difficulty to infect cattle with their vibrio of ovine abortion, and report two outbreaks of natural infection of cows with this organism. They suggest that cattle may be a factor in the epizoötiology of ovine abortion, and also make the following statement: "There seems to be little doubt that cattle can become infected with abortion, due to the vibrio, but there is a good deal of experimental evidence and field observation in favor of the view that infection by this microbe is rare."

Should Dr. Smith's spirillum prove to be identical with the English vibrio, and should it prove to be actually responsible for

the abortions that Dr. Smith reports, it would seem that it was a factor of much more importance in cattle abortion than the English investigators were led to believe. However, since all of Dr. Smith's cases were confined to a group of herds under one management, the figures given in his results can not be taken as indicative of the prevalence of this infection, even if the spirillum should prove to be a factor in causing abortions.

While abortions, even those of an infectious nature, are sometimes caused by other organisms than the Bang bacillus, I think I am safe in saying that could we by some magic destroy all of these bacilli in existence, our troubles from cattle abortion would for the most part disappear.

The abortion bacillus was discovered by Bang and Stribolt in 1897. The disease had been suspected of being of an infectious nature for a considerable time. Bang described the organism and its cultural characteristics, the principal one of which was its peculiar relation to oxygen, requiring a reduced oxygen pressure for its development. He also described the lesions found in the uterus, and reported that by introducing cultures of the organism into the vaginas of pregnant cows, he was able to produce abortion.

Not as much attention was paid to Bang's and Stribolt's discovery as it merited, and it was not until Bang in 1906 reannounced the discovery and reported the results of further work, in a paper before the National Veterinary Association at Liverpool, that investigation became active. Soon after this, their work was confirmed by several investigators, and McFadyean and Stockman in 1909, as members of a Departmental Committee appointed by the Board of Agriculture and Fisheries of Great Britain to inquire into epizoötic abortion, made extensive investigations, as a result of which they concluded that the bacillus of Bang was responsible for epizoötic abortion in Great Britain, but they were not able to confirm Bang's and Stribolt's findings as to the organism's relation to oxygen.

The Bang bacillus was not identified as the causal agent of abortion disease in America till 1910, when, according to Giltner, McNeal and Kerr published the first account of the isolation of the organism in this country.

The abortion bacillus is a short, non-motile, gram-negative rod, 1 to 2 μ. in length and about 0.5 μ in width, which stains readily with the ordinary anilin dyes. It grows slowly on ordi-

nary bouillon agar containing a small amount of bile or glucose and glycerine, but better on serum agar. A slight reduction in oxygen pressure seems to favor its growth. Bang seemed to think that reduced oxygen pressure was necessary for its growth, but other investigators have grown it in ordinary tubes sealed with paraffin, and even without sealing, if the tubes are prevented from drying out.

The abortion bacillus is killed by a temperature of 60° C., maintained for 15 minutes, but resists a temperature of 55° C., maintained for 20 minutes to three-quarters of an hour or more. It is therefore killed when present in milk by efficient pasteurization.

Cultures of the organism are able to remain alive for months. Mohler and Traum found bouillon cultures kept at room temperature for eight months to still be alive. While Holth kept cultures alive under similar conditions for nine months. Schroeder and I kept cultures in tubes sealed with paraffin in the incubator for over 900 days. In this case, however, there was slow multiplication and the test is not a measure of viability.

Bang found that the bacillus would remain alive in uterine exudate kept in the ice box for seven months. Holt obtained cultures from fetal material kept at 2° to 4° C. for eight months, and McFadyean and Stockman found that exudate contained living abortion germs after six to seven months, but that after a year they could find none.

The organism, when contained in uterine exudates and fetal material, withstands exposure to sun and weather to a remarkable degree. While McFadyean and Stockman found that exudate rich in abortion bacilli, artificially dried for three days, then powdered and kept for three months, was inert, they suggest that under natural conditions, exudate requires a long time to dry, because a hard crust forms on the outer layer and protects the inner mass. A small quantity may be quite moist after two months in the laboratory. In support of this, Schroeder and I found that uterine exudate exposed on the ground for 10 days in February, when the weather was warm for the season, was dried into a leather-like mass, but which still contained living abortion bacilli. We also exposed infected placentæ and fetal organs under fly screen in a wood from December 22, and found living abortion bacilli to be present at the end of January, or after 38 days, and also on May 5th, or after 135 days. During this time the material was more or less protected by fallen leaves.

It seems, therefore, from the evidence available, that the abortion bacillus has a fairly strong vitality, and while it does not bear spores, and so far as we know does not multiply under natural conditions outside of the animal body, its persistence and perpetuation are insured, in part, by its ability to remain alive outside the animal body for a long time. This fact is of great practical significance; because it shows that we cannot depend on natural agencies to destroy the organisms to the extent that we can in some other diseases. The products of abortion, the discharges which follow it, and the afterbirth and discharges following a normal birth from an infected cow, because, as will be shown later, they may also contain virulent bacilli, must be destroyed.

ANIMALS SUSCEPTIBLE.

While abortion may be experimentally induced in several species of animals, it is generally conceded that except in rare instances, cattle only suffer as a result of natural infection. It may be necessary to qualify this statement somewhat, since reports from the field indicate that sows, at least at times, acquire infection.

Good and Smith in 1916 reported the isolation of abortion bacilli from the afterbirth and fetuses of an aborting sow, and the experimental induction of abortions in sows by injection and feeding of such bacilli.

Dr. Connaway of the Missouri Station told me over a year ago that he and his assistant had found the blood of several sows, on farms where abortion disease was present among the cattle, to give positive reactions to the agglutination tests for B. abortus. Recently, Dr. Buck of the B. A. I., Division of Pathology, informed me that he has isolated B. abortus from the products of abortions from outbreaks of abortions among sows in Indiana, and that the blood of these sows gave positive reactions to the agglutination test for abortion disease. Should outbreaks of this kind prove to be common, abortion disease at once becomes of much greater economic importance than is even now generally believed.

LOCATION OF THE INFECTION IN THE ANIMAL, AND CHANNELS OF ELIMINATION.

The fetus, the fetal membranes, placenta and the discharges from the uterus at the time of abortion and for a time following

it contain the infection. Any discharges from the uterus shortly preceding abortion should, of course, also be regarded as dangerous. In the fetus, the bacilli seem to be most numerous in the stomach and intestines. They are also present in the liver, spleen and heart blood. The number of bacilli discharged at and following an abortion is enormous.

Infected cows also often discharge abortion bacilli from their uteruses at apparently normal parturitions.

The organisms disappear from the uterus within a few weeks, commonly not to exceed two or three, after an abortion or parturition. It persists a longer time if the afterbirth is retained than if the cow cleans properly. Its persistence is probably dependant to a considerable degree on the damage done to the uterus, and is shorter the more nearly the abortion approaches a normal parturition. The maximum length of time that Schroeder and I found the uterus infected after an abortion was 51 days.

Though we have searched repeatedly in the non-pregnant uterus for abortion bacilli, we have failed to find them except as noted above for a short time following an abortion or parturition. We thought that they might be eliminated from the uteri of infected cows at periods of œstrum, but we have failed to find this to be the case even though, as at the suggestion of Dr. Mohler, Chief of the Bureau, we gave cows large intravenous injections of abortion bacilli shortly before œstrum. Evidently the uterus is a favorable place for the development of the abortion only when it is actually functioning.

In addition to the genital tract, the udders of most infected cows, whether they abort or not, become infected in one or more quarters. The supra-mammary glands are also usually infected, and in one case Schroeder and I found that the infection had reached the lymph nodes at the brim of the pelvis. We have killed a number of infected cows and made careful search in their organs for abortion bacilli, but have found them only in the udder, the glands above mentioned, and in the pregnant uterus, never in the ovaries.*

The udder seems to be the only place in the non-pregnant cow where the bacilli can grow. It furnishes a culture field from which bacilli enter the blood stream, as is evidenced by the infection of the supra-mammary glands and those at the brim of

* Drs. Buck and Creech report having recovered abortion bacilli from a joint of an infected cow which showed lameness. Regions of reduced vitality may possibly become infected.

the pelvis. If the cow is non-pregnant, the bacilli, finding no favorable medium in which to grow, either perish or are returned to the udder; if, however, the cow is pregnant, the organism finds a favorable medium in the pregnant uterus where it can multiply. Beause of this, we often have infected cows either aborting a second time or producing apparently normal calves but with infected placentæ.

The behavior of the abortion bacillus in its relation to the udder of infected cows is very curious. Nowhere else among bacterial diseases do we find a similar relation. The fact that a large proportion of infected cows harbor abortion bacilli in their udders for long periods is a unique phenomenon. True, with many bacterial diseases some cases become carriers, and in some, like the Typhoid Marys and Johns, remain carriers and disseminators for many years; but they may be regarded as accidental, and not essential to the perpetuation of the disease. The infection of the udder with the abortion bacillus, however, seems to play a definite part in the survival of the organism. In the diseases caused by protozoa, such as Texas fever, surra, malaria, etc., most recovered animals remain carriers for a considerable period, and this is necessary for the perpetuation of the organisms, because the infective agent is carried from animal to animal only by insects, which in some cases also act as true intermediary hosts in which the organisms undergo a stage of their development. With the ordinary bacterial diseases few carriers are necessary to secure their perpetuation, because the animals they attack are at all times more or less susceptible. Conversely, since carriers are so numerous and persistent in abortion disease, it seems likely that there are only short periods in the life of the animal when proper conditions exist for the implantation of the bacillus, and, we may assume, that evolution has provided the bacillus, to insure its perpetuation, with ability to maintain itself in the udder without endangering the life of its host. The bacillus is unique in seeming to require embryonic tissue for its active development, which is present in animals only during the relatively short periods of their existence. Growth in the udder may be likened to a resting stage of the bacillus, multiplication there is evidently slow and no resistent tissue changes seem to be induced in the organ. A sort of commensal relation seems to be established between the bacillus and the udder cells.

The above relationship seems to point to a critical time of infection in the cow, and that this is the period of gestation. Observations of Schroeder and myself lead us to believe that most infections probably occur after the cows become pregnant; and from then until the placenta ceases to be active. Just when the danger of infection is greatest we are not ready to say, but it seems reasonable to believe that it may not be till some time after conception, and is not until there is a sufficient culture field of embryonic tissue on which the bacilli can grow. As to the upper limit of infection we have some knowledge. We found that an intravenous injection of abortion bacilli made 11 days before parturition caused the infection of the placenta, and that an injection into the udder, 53 days before parturition, had the same result.

The udder may be infected in one or more quarters, and though the presence of the bacilli can not be determined every day, their elimination is fairly constant, and may persist for years. In one case under our observation, elimination continued 6½ years, and in many others for several years. The udder seems to be a reservoir from which the uterus can be reinfected, and from which a more or less constant stream of abortion bacilli flows to the outside world. In the case of the infected uterus, the discharged material is much more intensely infected, but, as a rule, it is discharged only during a short period, whereas in the case of the udder, the bacilli are quite likely to be given off more or less constantly as long as the cow is in milk.

A small percentage of bulls react to the complement-fixation and agglutination tests. This means that they either are or have been infected. The reactions are not as marked nor do they persist as long as in cows. This seems to indicate that the infectiton does not find so favorable a soil in which it can maintain itself as it does in the cow.

Schroeder and I made tests of the organs of four reacting bulls for the presence of abortion bacilli. The first of these bulls at one time reacted in a dilution above 1-200, but some time before he was killed the reaction had faded out. No abortion bacilli were found in his organs. The second bull which had reacted in a dilution of 1-400, but which had dropped to 1-200, on autopsy showed the presence of an abscess in one of its epididymides. We proved this to be infected with abortion bacilli, but were unable to find these bacilli in the seminal vesicles or any other

organs. In this case the passage to the seminal vesicles was probably blocked off.*

The third bull had reacted in a dilution of 1-800, but had declined to 1-400. No microscopic lesions were found, but we were able to recover the organisms from the lymph glands at the brim of the pelvis. The fourth bull, unlike the above three cases of natural infection, had been artificially infected by receiving a large intravenous injection of abortion bacilli. He was killed three weeks later. Abortion bacilli were recovered from the glands at the brim of the pelvis but from no other organs.

Our observations lead us to believe that bulls are not often infected, and the available evidence is not sufficient to incriminate the bull as a common disseminator of abortion disease. Even if their seminal fluid is infected, we are not certain that the cow served would become infected. True, it seems that she would, but we have some experimental evidence which indicates that this may not usually be the case. The three infected bulls recorded above served a considerable number of cows without infecting them, but, as the precise importance of the bull in his relation to abortion disease remains to be measured, we should take no unnecessary liberties with him of a kind which may lead to disaster such as promiscuous use, the exposure of uninfected cows to reacting bulls, etc.

METHOD OF INFECTION

While the channels of elimination are fairly well known, the exact modes of infection are a matter of discussion. Formerly much weight was attached to the soiling of the external genitals of the pregnant cow as a mode of infection. It was supposed that in some way the infection entered the vagina and finally reached the uterus. Bang, while admitting this possibility, attached more importance to the bull as a means of infecting the cow, "as that is," he said, "the only way in which direct introduction of the virus into the uterus can be effected."

It is quite natural to assume, when the infection of an organ which has a direct opening to the outside occurs, that the infecting agent enters directly through that opening. But this is not necessarily the case. In fact, it seems that evolution would have provided those openings with such defenses that direct infection

* Drs. Buck and Creech of the B. A. I., Division of Pathology, tell me that they have found the seminal vesicles of four bulls to be infected, and to show definite lesions.

would be difficult. In the case of pulmonary tuberculosis, the first and most natural thought was that the infection entered through the air passages, the most direct route, and it was a long time before the more circuitous, but possibly easier route via the digestive tract and blood stream, was seriously considered as an avenue of infection. Just so with abortion disease; the first thought was that infection occurred directly through the external opening of the genital tract, but now the evidence points to infection via the intestinal tract and blood stream as the more probable route.

It has been quite commonly believed that the bull, even though not infected himself, was a mechanical carrier; his penis becoming soiled with abortion bacilli from serving an infected cow, and he introducing the infection into the genital tract of the next cow that he served. While this seems very likely, we have very little evidence to show that it often happens. While Bang attached much importance to the bull as an agent of infection, McFadyean and Stockman, without denying that the disease may sometimes be spread by coitus, are of the opinion that nothing more than a subsidiary rôle in the spread of infectious abortion can be assigned to the bull. Hadley and Lothe were unable to infect heifers either by having them served by reacting bulls or by bulls that previously served reacting cows. Up to the present time, Schroeder and I have failed to infect cows through the agency of bulls, but we are not yet ready to say that it cannot be done. The evidence does not encourage the idea that the bull is an important factor in spreading the disease. The fact that in our observations reacting bulls did not transfer the disease to the cows they served, should not be used as a reason for excluding infected bulls as possible disseminators of the disease, because to prove that one method of contact between an infected bull and a cow does not transfer the abortion infection, throws no light on the harm a bull may do through now unknown and possible methods through which he may expel abortion bacilli from his body.*

It seems to be difficult to infect cows artificially via the vagina, and even when they are infected in this way, we are not certain

* Drs. Buck and Creech of the Division of Pathology of the Bureau of Animal Industry have isolated *B. abortus* from the enlarged testicle of a bull. The testicle showed marked lesions, and the attendant reported that the bull's seminal fluid was of abnormal appearance. It is quite likely that this bull had been discharging *B. abortus* with his seminal fluid. Even though such a bull may not infect cows directly through their genital tracts, and of this we are not certain, he might easily do so through the discharged seminal fluid contaminating food which susceptible cows may eat.

that the bacilli deposited on the mucosa are not absorbed and reach the placentæ through the blood stream rather than by direct passage through the os uterus. Schroeder and I have had little difficulty in infecting pregnant cows, by intravenous injection, by injection into the udder through the milk duct, or by feeding; but the few attempts that we have made to infect cows through the vagina, have failed. Non-pregnant cows are much more difficult to infect. Our observations indicate that the commonest mode of infection is by the ingestion of infected food and drink, and that the most susceptible period is that of gestation.

As stated above, we were able to infect a cow's placenta by injecting abortion bacilli into the udder through the milk duct. Therefore, this is a possible route of infection, but whether under the ordinary conditions of milking bacilli would enter the udder through the milk ducts we are not ready to say. We have an experiment in progress which we hope will throw some light on this point. We have, however, proved this much: that once the bacilli enter the udder of a pregnant cow, they may reach the uterus. We have yet to prove whether, under normal conditions, enough abortion bacilli can enter the udder to set up infection. At present, we can only say that the udder is a possible route of infection. As to the period from infection to the expulsion of the fetus, we can say little except that it varies. In all probability it depends both on the natural resistance of the cow and the intensity of infection.

SYMPTOMS.

Premonitory symptoms of infectious abortion are rare, and often pass without being observed. When present, they begin from a few hours to two or three days before expulsion of the fetus. One of the early symptoms is the sudden swelling of the udder, but this would not be noticed in cows in milk. Too much weight must not be given to a slight swelling of the udder, for this is apt to occur about the fifth or sixth month of pregnancy in healthy animals. Cows in milk may show a change in quantity and quality of the milk, the milk becoming more like colostrum. The animal becomes uneasy, its vulva is slightly swollen, and mucus, which may be blood-stained, is discharged from the vagina at intervals. This is followed by a yellow odorless discharge. These discharges soil the tail and may be sufficient to soil the floor behind the animal.

Abortion most commonly occurs between the fourth and seventh month of gestation, and occurs most often in the first and second pregnancies, though it may occur in any pregnancy. It may occur twice in the same animal, and rarely three or more times. If a cow aborts in the early months of gestation, the fetus and its membranes are expelled together and the uterus soon contracts. If the abortion occurs later, the afterbirth is apt to be retained. Some of the fetuses are born alive, but are weak, and usually die within one or two days.

Following an abortion there is usually a discharge, which may vary in character from a clear mucus containinig islands of chocolate-colored material to a dirty, yellowish-gray, muco-purulent substance. This discharge may continue for two or more weeks, dependent in a large measure on the degree of completeness with which the afterbirth is passed. If the afterbirth is retained for a considerable period, all the evils attendant on the retention of a putrifying mass within the uterus may result. But of course this is apart from the abortiton and would be likely to occur from retention of afterbirth from any cause. All retained placentæ should not be charged too hastily to the abortion bacillus.

It is common for cows that have aborted to require several services before the next conception takes place. At the Experiment Station we have had such cows that required six or more services before they conceived, and of 8 such cows, 5, or 62½ per cent, required an abnormal number of services for conception, and one failed to conceive at all. The second conception following an abortion usually requires only one or two services. Evidently considerable damage is done to the mucous membrane of the uterus by an abortion, and a varying length of time is required for its repair.

DIAGNOSIS.

By all means, if it is possible, use the agglutination or complement-fixation test to determine if infectious abortion exists in a herd. Both tests are reliable, but because of its simplicity the agglutination test is to be preferred. This test will show definitely whether the animal is or has been infected. It will not tell whether a cow will abort, because all infected cows do not abort. But it will point out the animals that are probably dangerous, in much the same way that tuberculin points out the animals that are or may become dangerous.

Schroeder and I have used the agglutination test for several years, and have found it to be as reliable as any biological test with which we are acquainted. None of these tests tell us whether or not a disease is going to terminate fatally. Abortion is the fatal termination of abortion disease. All cases of abortion disease do not terminate fatally. We have both weak and apparently normal infected calves born. These are cases that did not terminate fatally.

We have found reactions in infected cows to occur in dilutions of 1-100 to 1-3200, and in many instances found them to persist for long periods. We have reasons to believe that reactions will persist as long as abortion bacilli remain in the udder and for some time after, and that the reactions often persist at a high level for long periods. In no case have we found the milk to be infected unless the cow also reacted to the agglutination test.

The milk of reacting cows agglutinates abortion bacilli but in somewhat lower dilutions than the blood. Colostrum, however, agglutinates in much higher dilutions, sometimes as high as 1-25000; and in cows in which the reaction has disappeared from the blood, the colostrum will still show agglutinating power. The test of the colostrum is therefore much more delicate than that of the blood.

Calves of aborting cows often, but not always, react. The reactions, when they occur, are usually in approximately the same dilutions as those of their dams, and after a few weeks they fade away.

Regarding the reactions in calves, Schroeder and I have tentatively concluded that they are very apt to be associated with the presence of abortion bacilli in the placentæ. If further studies prove this to be true, it seems likely that the infected placenta is the source of the agglutinins in the calf, and that they do not pass preformed from the blood of the dam. This is reasonable, since it is in the placenta that the greatest changes seem to occur, and it is here that the greatest fight between the invading organisms and the tissue cells probably takes place. We do not wish this tentative conclusion to be accepted as a proved fact. The evidence we have is satisfactory in character, but not yet sufficiently abundant to establish a fact.

The reaction in calves, as far as has yet been determined, has no significance so far as the perpetuation of the disease is concerned. The reactions soon disappear, and we have every reason

to believe that when the calves reach maturity, unless reinfected from other sources, that they will be free from infection.*

Schroeder and I have found that blood will keep in sealed tubes for months, and that the suspension of abortion bacilli used for making the test will keep an equal or longer time. Therefore, the practicing veterinarian can draw the blood and send it to a laboratory to be tested, or if this can not be done, he can do the testing himself, as only simple apparatus is necessary.

The veterinarian who can make use of the agglutination test has it in his power to give to his clients information that may enable them to protect their herds against the introduction of infected animals, and to enable them to separate the probably dangerous from the probably safe animals in infected herds. In our opinion, no animal that reacts in a dilution even as low as 1-50 should be regarded as safe to be taken into a healthy herd.

It should be borne in mind, that when biologic tests of any kind are made, irrespective of whether they are agglutination, complement-fixation, or abortion tests for abortion disease, or tuberculin tests for tuberculosis, failure to obtain a reaction is not absolute evidence that the tested animals are free from infection unless an interval of time is known to have passed since their last exposure to infection.

If the agglutination test can not be made, the veterinarian must resort to a study of histories and symptoms in making a diagnosis. The history of the herd as to previous abortions and recent purchases of animals should be carefully inquired into, also the presence of abortions on nearby farms, sources of food supply, etc. If an abortion occurs, careful search should be made in the afterbirth and uterine exudate for the yellow or chocolate-colored masses, and the dirty yellowish discharge from the vagina which often, but not always, persists for some time. If microscopic examination of the fresh uterine exudate or of portions of the cotyledons reveals large numbers of small short bacilli, in clumps, they are apt to be abortion bacilli. Retained placenta, while it should arouse suspicion, is by no means evidence of the disease. An abortion occurring in a herd that has been free from the disease should be regarded as suspicious until it has been definitely determined that it is not infectious. To be sure, all abortions are not due to infection, but most are, and until one is certain that he is not dealing with infectious abortion he had

* Reactions in calves may be indicative of immunity.

best take the precautions that should be taken with animals affected with this disease.

PATHOLOGY.

In abortion disease no pathological changes that can be demonstrated seem to occur outside of the pregnant uterus. In this the changes seem to be mainly confined to the cotyledons and the fetal membranes. The fetus seems to die because its supply of nourishment and oxygen is interfered with, and does not present marked lesions, though sometimes a marked subcutaneous œdema is present. The cotyledons are congested, sometimes hemorrhagic, and usually show areas of necrosis, dirty yellowish in color. Though the udder is infected, no one has yet, so far as I know, demonstrated any changes in it.

TREATMENT.

Treatment of infected animals, up to the present time, has given very poor results. Extravagant claims have been made for carbolic acid, methylene blue and urotropine, administered internally. In some cases the number of abortions seemed to be reduced by the administration of these substances, but when the remedies were put to real tests, they failed. A good deal of false hope regarding these rememdies is due to the fact that abortion disease naturally tends to die out in herds into which no new animals are introduced. Abortions are very plentiful one year, the next year treatment is given and the number is much smaller. The remedy is at once given credit for the reduction, while if no treatment had been given the result would likely have been the same.

Bacterin treatment has been tried, but while its precise value has not been determined, it offers little hope.

The cow, after she has aborted, if she retains her placenta, requires treatment. But don't think that you can disinfect the uterus by the use of strong disinfectants without doing much damage to it. Most of the disinfectants do more harm to body cells than to bacteria. Remove the retained placenta by gentle mechanical means which do not injure live animal tissue. Flush out the uterus thoroughly with salt solution in order to remove the masses of necrotic material and exudate, and rely on the natural defensive powers of the tissues to destroy th remaining germs. Vigorous measures can be used to destroy abortion or other bacilli after they leave the animal body, but as long as

they are in contact with living body cells, it is far better to confine ourselves to the use of gentle means to remove them than to try to destroy them in situ, and in so doing weaken and destroy myriads of valuable body cells.

How can we hope to render the uterus, with its numerous crypts and glands, sterile by the application of a substance which kills the uterine cells more readily than bacteria, unless we dedestroy most if not all of its mucous membrane. If the process of sterilization is not complete, the living bacteria remaining find in the dead cells an excellent medium, contained in an excellent incubator kept at the proper temperature for their multiplication, and in addition more or less free from the restraining influence of the normal cells and their exudate, which is much reduced or absent because many of the living cells have been paralyzed or damaged by the disinfectant. Under such conditions a very few germs would become myriads in a very short time. The normal germicidal power of vital tissue and exudate is very considerable, but this will certainly be reduced or lost if the cells are damaged by strong chemical substances.

Modern war surgery has taught us the following lesson: Whenever a wounded and possibly infected surface is to be treated, our efforts should be directed to the removal of infection and all dead and devitalized material in which bacteria can grow by gentle means, and an avoidance of those measures which are supposed to kill bacteria without removing them or the dead tissue, etc.

PREVENTION AND ERADICATION.

We have much to encourage us in our efforts to control and eradicate abortion disease. While there are many unknown factors in the problem, there are several known ones, and these will aid in the discovery of more. We know the cause of the disease, many of the characteristics of the infective agent, and the sources from which it flows. We know that it is a definite, tangible thing which has no motion of its own, but must depend on outside forces to carry it to a new victim. We have discovered some of the agents that carry it from place to place, and can detect those animals, even though apparently healthy, which harbor the infection. We also know at least one of the portals by which the infection enters an animal. It seems that with so many known factors we ought to be able to make some little progress in controlling the disease.

Let us first of all consider the precautions that promise to be effective in protecting the as yet uncontaminated herd. Though the disease is widespread, we are not justified in assuming that it is universal. Very many herds are undoubtedly still unaffected and the protection of them seems to be of first consideration.

In my judgment, the most likely agent to carry the infection into a new herd is the newly-purchased, infected, pregnant cow, that will abort or have a seemingly normal parturition, but with an infected placenta, some time after she has entered the herd. At this time she scatters a plentiful supply of infection about the stable, barnyard and pasture, where it is apt to soil the food or water of healthy susceptible animals. Or she may, if the bull is a factor in the transmission of the disease, infect him. Moreover, if the infection fails to become implanted in susceptible animals at this time, there are still chances in the future, because the infected cow is very likely to produce infected milk for years, and her placentæ and discharges at future parturitions may prove to be infected. She is therefore apt to be a more or less continuous spreader of relatively small amounts of infection, and at times may discharge large amounts of it. *We should always bear in mind that an apparently healthy cow may be a chronic carrier and disseminator of abortion bacilli.*

We can protect the healthy herd against animals of this kind, and also against infected bulls, by the use of the agglutination or complement-fixation tests. No bovine animal should be allowed to come into the herd unless its blood has first been subjected to one of these tests and proved to be negative. The test should be made after a period of several weeks' quarantine, because it takes some little time, just how much we do not know, for antibodies or agglutinins to develop in an animal's blood after the infection has gained entrance; therefore, an animal which showed no reaction at the time it was purchased, might show one a few weeks later, because, when the first test was made the animal may have been so recently infected that agglutinins and antibodies had not had time to develop. The above applies to biological tests in general, including the tuberculin test. Failure to obtain a reaction should not be regarded as absolute evidence that the tested animals are free from infection, unless an interval of time is known to have passed since the last exposure to infection.

Another possible source of infection is the supply of feed and forage, other than that produced on the farm. As has been pointed out, ingestion is one, if not the principal mode of infection. Feed or forage produced on a farm where infectious abortion exists may become soiled with discharges from aborting cows or with milk from infected cows; and since the abortion bacilli can withstand the action of natural destructive agents for a considerable time, one would be taking considerable risk in feeding such feed or forage to healthy cows.

Under this head we should consider another food product which is a greater menace than ordinary purchased grain and forage; this is unpasteurized separator milk returned from the public creamery. Such milk is one of the best agents for spreading disease germs, and especially abortion germs, which are so frequently found in the milk of cows infected with abortion disease. To be sure, the milk is not fed to cows, but nevertheless the germs are brought to the farm and the chances that some of them will reach the cows' feed is considerable. Furthermore, recent experience in your state indicates that under certain conditions hogs may become infected, at least by some strains of the abortion bacillus. A large share of separator milk is fed to hogs. Pasteurization or sterilization of milk makes it safe, and should be insisted on at all times.

The dog is another agent which brings abortion infection and many other infections to the farm. When we consider the dog's fondness for animal tissue, even if it is partly decomposed, and that he has a habit of carrying large pieces of such tissue home with him and burying it for a future meal, we can appreciate the damage he may do. We can readily imagine a dog visiting a barnyard or pasture in which an abortion had occurred and bringing a large amount of infection home with him, there to contaminate grass, feed or water given to susceptible cows.

With our present limited knowledge of abortion disease, it is not an easy matter to determine what is best to do with infected herds. Choice, however, may be made from three general methods of control:

1. Cleaning the herd by radical methods; using the agglutination test to determine the infected animals, and retesting to detect possible latent cases of infection.

2. Immunization by natural processes; keeping the losses down as much as possible by sanitation while the herd is becoming immune.

3. Artificial immunization acompanied by sanitation.

The first of these methods, where it can be economically practiced, ought to be the best; because, if it is sucessful, the herd soon becomes clean and free from carriers; and, after a proper safety period to allow possibly latent cases to develop to the extent that they can be detected by serological tests, animals could be safely transferred from it to other herds. The advantage of this will be especially appreciated by the breeder of pure-bred cattle.

To clean a herd by this method will require diligence on the part of the owner, and if the disease has become well established, may not be feasible except among animals of more than usual value. If, however, the disease has been only recently introduced, or only a few animals have become infected, it ought to be possible to clean the herd without great expense.

In carrying out this method, the herd should be tested by the agglutination test, all reacting animals at once eliminated, and all likely extra-animal sources of infection removed by a thorough cleaning of the premises. Retests of the herd should be made at short intervals (two or three months) until it is reasonably certain that no latent infection is present.

The disposition of the reacting animals is not an easy problem; many of them are perfectly serviceable and may never abort, but they are unsafe animals and should not be allowed to associate with healthy ones. We cannot be sure that they will be safe till they cease to react, which may be years in the future. Their offspring, however, if kept from their dams and other sources of infection after they are weaned, are free from the disease, so far as we know. Unless the reacting animals have unusual value, or can easily be isolated well away from the healthy herd, it is probably best to sell them for immediate slaughter.

The second method of treating the infected herd is based on observations made by many veterinarians and cattlemen to the effect that the disease tends to die out in a herd into which no new animals are introduced; the herd being kept up from its own offspring. The young animals reared in an infected environment seem to acquire immunity in some way.

Dr. J. P. Turner, now Major Turner, has had under his care a large dairy herd belonging to one of the public institutions in the District of Columbia. He reports that for many years the herd suffered much from abortions. New cows were constantly being brought in to replace those that became unprofitable. As long as this practice continued, abortion disease was very troublesome. The institution finally abandoned this method and used its own heifer calves to replenish the herd. Since this change was made there has been a great reduction in the number of abortions. Of course it remains to be seen whether this good record will continue, but evidences from other sources lead one to believe that it will.

This plan of control, while not requiring so much effort as the first one, has the disadvantage of being rather expensive when the losses due to abortions and their sequelæ are taken into account; and furthermore, the herd will have to be regarded as an infected one for a long time, possibly as long as the original animals remain in it.

The losses from abortions while the herd is acquiring immunity can, no doubt, be greatly reduced by protecting the non-reacting cows while they are pregnant, from the reacting ones that are pregnant or have recently aborted or given birth to calves, by removing them as far as possible from the infected environment. It is also desirable to prevent, as far as practicable, mass infection by the products of an abortion or an infected placenta or discharges coming in contact with the herd. Immunity to this disease is probably relative, and can be broken down by an excessive exposure. The point to be aimed at in this method of immunization should be to give non-pregnant animals repeated exposure to small amounts of infection.

In order to prevent mass infection, it is a good plan to provide a maternity stable to which cows showing evidences of approaching abortion or parturition can be moved, and where they can be kept until they have aborted or given birth to calves and all discharges from their uteri have ceased. If a cow then aborts, or gives birth to a calf with an infected placenta, the infected material will be in a confined place where it can be taken care of instead of being scattered among the herd. Such a stable need not be elaborate or expensive; in fact, the simpler the better, provided it gives the necessary protection to the animals and is so arranged that it can be easily cleaned and disin-

fected. It should contain a sufficient number of box stalls to accommodate the maximum number of cows that may become fresh at any one time. The stall partitions should be tight, in order to limit any infected material that the cow may pass, to her stall. The infected material can then be destroyed. After the cow has ceased to discharge, the stall, and better, the entire stable, should be thoroughly cleaned and disinfected.

The third method of control is that of artificially inducing immunity by the subcutaneous injections of living abortion bacilli about two months before conception. The method has been developed by McFadyean and Stockman in England. Their work, however, was based on that of Bang, who gave repeated injections of living abortion bacilli in increasing amounts, before the cows were bred. McFaydean and Stockman found that they could safely give a single massive injection of living bacilli about two months before conception, and acomplish about the same results as by the repeated injections of much smaller amounts. A large number of cattle in England have been treated by this method and the results seem to be promising. Since living bacilli are used, the method is recommended for infected herds only.

Immunization by this means is being tried in this country, but it is too early as yet to measure its value. It must still be regarded as in the experimental stage and must be used with care. In addition to its limitation to infected herds, it has the further objection that there is always the danger of making a carrier of the immunized cow through udder infection. This, however, may not be of serious moment, at least in herds in which no other attempt is made to control the disease, because most of the cows would likely become carriers anyway through natural infection. It is to be hoped that this method of immunization will soon be improved, or an entirely new one developed that will make it possible to certainly, safely and cheaply immunize; for such an agent would be of incalculable value in controlling abortion disease. In measuring the value of an immunizing agent against this disease, it is well to remember a suggestion made by Dr. W. L. Williams, to the effect that all factors concerning the output of the herd must be taken into consideration, and not the abortions alone. In other words, we must be sure that reductions in abortions are not gained at the expense of the breeding and milk-producing efficiency of the herd. It is also well to bear in

mind that while the animal's body probably has the machinery for immunization, it is a very intricate and delicate mechanism, and if we do not know its parts and the laws which govern their operation, we may do considerable damage if we carelessly attempt to set the machinery in motion. With our present knowledge, we should feel our way carefully till we get more light, lest we do damage in tampering with a delicate yet powerful piece of machinery. Even where artificial immunization is practiced, it is highly desirable that exposure of pregnant cows to massive infection be prevented as much as practicable, and that other sanitary measures be adopted.

Regarding the bull, though the evidence does not prove him an important factor in the spread of infectious abortion, it would be far from a safe policy to ignore the danger that may come through him. If the herd is free from disease, he certainly should not be allowed to serve outside cows unless it is known that they are from clean herds. Neither should an outside bull be permitted to serve cows in the herd unless it is known that he comes from a clean herd. If, on an infected farm, a single bull must be used to serve both abortion-free and infected cows, he should not be permitted to serve an infected cow until at least two months have elapsed after she aborted or gave birth to a calf. The service should take place on neutral ground, and he should not be permitted to serve a healthy cow for a few days after.

All infected material, such as placentæ, fetuses and uterine discharges should be burned or buried at once, and not permitted to lie about where it can be carried on the feet of persons or animals, or by hogs, dogs or rats, to places where it may infect cattle.

In disinfecting stables which become infected, the one fact that should be borne in mind above all others is, that to be effective, the disinfectant must come into actual contact with the germs to be killed. It can not do this if the germs are covered with a thick layer of dirt or manure. Thorough cleaning without disinfection is very apt to be more effective in preventing the spread of disease than disinfection without cleaning. As an agent for the disinfection of stables, the Experiment Station of the Bureau of Animal Industry uses a 1-700 bichloride of mercury solution. This has always been found to be effective, but of course there are many other agents possibly equally as good.

The disinfection of the external genitals and the douching of the vaginas of cows as measures to prevent infection has many advocates, but it seems to me, that besides being useless, work of this kind is more apt to do harm than good, and that it is far better to leave the protection of the vestibule and entrance to the uterus to unhampered natural agencies.

Some investigators advocate that extreme measures be taken to protect the calf from infection, but Schroeder and I are led to believe from our observations that this is not necessary. We have allowed calves to remain with their infected dams, and have placed calves from infected cows on uninfected cows, and vice versa, but up to the present we have not succeeded in infecting any of them. However, we have had a limited number of animals under observation, and for too short a time for our results to be conclusive. But it certainly is very difficult to infect young calves to a degree which makes it possible to determine that they are infected. A calf that reacts to the agglutination test at birth will, within a few weeks, cease to react, even though it is in the meantime consuming its mother's milk which may be highly infected. In no case has the calf of a normal cow nursed by an infected cow given a reaction. It is even possible that the consumption of infected milk by calves may produce a certain amount of immunity, and this idea is in harmony with the gradual development of herd immunity in herds into which no new animals are introduced. It seems from our present knowledge that it is fairly safe to allow the calves to remain with their dams till weaning time, or even till the end of the first year of life.

It is well to remember that it is not many years ago that the Texas fever, tuberculosis and hog cholera problems were as mystifying as that of abortion disease is today. We now know enough about the first of these to completely drive it from the land, and this is actually being done so rapidly that the end is not many years off. Our knowledge of the second is certainly sufficient to control the disease, and likely also to eradicate it completely. It is only a matter of making use of the knowledge we have. I do not mean by this that tuberculosis will cease to be a factor in our animal industry within the immediate future, for its control and eradication is a stupendous task and is going to take time, but I do believe that we will eventually succeed even with our present knowledge. Of hog cholera, as you well know, while our knowledge is not complete, nevertheless great losses

are being prevented by making use of the facts that have been discovered. Formerly the veterinarian was at a loss to know what to do or to advise when he was forced to undertake the abortion problem. I feel that the time of this state of helplessness is passing, and that already there is much actual service that the veterinarian can render towards reducing the losses from abortion disease, and as time goes and our knowledge becomes more perfect, he can render more and more. He is rendering splendid service in combating the other three great plagues which affect the animal industry, and I am sure that he will give the same kind of service in this. He need have no fear that he will work himself out of a job, for of work in the realm of veterinary medicine, as in every other field, there is no end if we but look for it.

In closing I would like to emphasize the following:

1. Most cows that are infected with abortion disease become and remain carriers and eliminators of infection through their udders for long periods.

2. The placentæ of infected cows at what seem to be normal parturitions may be infected.

3. The most probable route of infection is the digestive tract.

4. The most susceptible period seems to be that of gestation.

5. The greatest source of infection is the aborting cow at and following an abortion.

6. Though the evidence points to the bull as playing only a minor part in disseminating this disease, it is not safe to take liberties with him.

7. Calves seem to be insusceptible, and the progeny of infected cows usually remain free from infection unless exposed to it after they are a year old.

8. Do not try to kill abortion or other bacilli when in contact with delicate animal tissue by the use of strong disinfectants.

9. The agglutination test will detect infected animals except those too recently infected to have developed a reaction. It is an excellent test but is not prophetic nor perfect. It will not tell whether an animal will abort, but will tell whether she is apt to be dangerous.

10. The veterinarian can do at least three things in helping to control abortion disease. They are as follows:

(*a*) He can make an accurate diagnosis. Means are now at hand by which infected animals may be detected.

(*b*) He can give advice as to means of protecting healthy herds, of reducing losses in infected herds, and possibly cleaning up such herds.

(*c*) He can give rational treatment to the uteri of cows following abortions and to the uteri of infected cows following parturitions in which the placentæ are retained. It is important that the injured uterus be gotten back into as nearly normal condition as possible at an early date, because it is quite likely that this will have much to do with the cow's next conception both as to the promptness with which conception takes place and as to whether it will be followed by a normal birth. Also, the length of time that abortion bacilli will continue to be discharged from the uterus probably depends, to a great extent, on the rapidity of repair of the lesions in the uterus.

VETERINARY TRAINING PREPARATORY FOR THE ARMY.*

P. A. FISH, Chairman.

The European war has disturbed the equilibrium of the world to the extent that many lines of activity will never again return to the precise conditions existing before the war. Readjustment, even in unexpected quarters, will be necessary in order to meet the demands of the future. In educational, as well as other affairs, this must occur. In general subjects to some extent, in professional and technical subjects to a greater extent, there must be pruning and elimination of the non-essentials and development along lines which, properly coördinated and directed, represent efficiency and practical utility.

The best insurance against trouble is preparedness. The best reason for the existence of an educational institution is its usefulness. The more necessary it becomes in the utilities of the public, the stronger it stands as a necessity with a correspondingly decreased danger of failure.

* At the Semi-Centennial Celebration of Cornell University, conferences were held in the different colleges. In the Veterinary College Conference, there was an extended program consisting of reports by committees of the alumni on the various ways by which its work could be improved. Among these reports was one on "Veterinary Training Preparatory for the Army," presented by a committee of which Major P. A. Fish was chairman. Lt. Col. R. J. Stanclift, Major R. J. Foster, Major A. L. Mason and Capt. W. E. Muldoon were the other members. This was sent to the Editor by the Dean of the College, who states in his letter: "This report contains so much of interest that I feel it will be quite as helpful to the faculties of other veterinary colleges as it has been to us. As it deals, for the greater part, with the subject generally, rather than with specific reference to our college, I am sending it to you for publication in the Journal in order that all of the veterinary colleges may have the advantage of the suggestions made by the committee."—EDITOR.

The first Veterinary School, established at Lyons, France, 1762, was because of war conditions. The great loss of horses in the wars preceding that date caused such a drain upon the resources of the countries involved that the necessity for adequate knowledge, in the care of injuries and the treatment of disease, for the conservation of these animals became of the utmost importance. The first great impetus for veterinary education, therefore, came through war and its depleting effect upon live stock. In the course of time, with increased ravages from epizoötics among the other domesticated animals, the establishment of a veterinary school was more than vindicated. Other veterinary schools were established in quite rapid succession in other countries as well as France. Although the military side of veterinary education gradually subsided in most of the schools, it was maintained and, in later years, perhaps, intensified in the Germanic countries. It is well to remember the original demand for veterinary education, and, profiting from recent experience, realize that the present-day veterinary curriculum can, without radical change, be rounded out to serve adequately the needs of both army and civil veterinarians.

In the past there has been little or no attempt on the part of the veterinary schools to arrange the curriculum to the needs of the veterinarian entering military service. This has doubtless been due to the fact that there has been little demand for it. Until after the outbreak of the European war, the veterinarian in the U. S. Army held an anomalous position. Charged with responsibility for the health of the Army animals, he was without rank or authority, without adequate assistance and with no system of records. Under such conditions the highest results could not be expected, nor very much inducement offered for young men to enter the service.

With the participation of the United States in the war and with the incorporation of the veterinary branch in the Medical Department with the long-sought-for rank, a more attractive field has been opened. For an officer, the Army seeks a man well educated in general subjects, as well as the more technical one of the profession for which he has prepared himself. This is natural and necessary if he is to associate with officers in other branches and is to be a real leader of men, with proper responsibility for material placed in his care.

With the changed status as to rank and a more comprehensive, as well as a more detailed, knowledge of the problems gained from the experience of the war, it may be expected that more young men will be inclined toward army veterinary service. The progressive veterinary college, desirous of serving the state and nation, should, to meet this demand, scrutinize carefully its curriculum and adjust it in such a way that the basic needs of any veterinarian shall be maintained and yet afford opportunity for features of special benefit for those desiring to enter army service. In a general way, it may be questioned if a course of instruction designed for the veterinarian entering military service would not be of just as much value for a veterinarian entering civil practice.

In many instances certain of the courses already given need only slight modification; other courses should be extended, and in some cases a relatively few new courses may be required.

Since he is to become a part of the military organization, it should be obvious that the Army veterinarian should have some knowledge of fundamental military affairs which, at first glance, appear to be wholly isolated but later may be found to have a real value in coördinating his professional knowledge with his military environment.

In the case of some veterinary schools associated with universities, military drill is already a part of the curriculum. In addition to the drill, which is important, a course of lectures on military science in the university, dealing with basic principles, should be attended by the veterinary students, for the student should realize that he is preparing himself for the duties of an officer as well as a veterinarian.

One of the factors of military training which has received much favorable comment has been the transformation in the physical bearing and efficiency of the young men after experience in the service. Indifference, neglect of details, even slouchiness, has been evident in many who possessed collegiate training. Although ignored in the college curriculum, morale is a factor which should receive consideration as a fundamental principle, especially in the case of young men planning to enter the Army. Each department in a professional school has a certain responsibility, and by its methods of administration, attention to details and efficiency, can do much to develop in the student such quali-

ties of neatness, orderliness and system as will reflexly influence his later career and expedite his progress in the service.

A brief outline of the duties of Army veterinary service may be considered, as follows:

1. The care of all sick animals in a given command, including not only their professional care, but the operation of veterinary hospitals, the preparation and preservation of records, and the administration of the veterinary detachment.

2. Veterinary hygiene and sanitation, dealing with the health and efficiency of animals, including the control of communicable diseases. Except where given as separate courses, such a course might comprise the sanitary inspection of stables, corrals, picket lines, forage and bedding, methods of feeding, watering, grooming, shoeing, improvised stabling, correction of sanitary defects, detection and segregation of communicable diseases, mallein testing, and suitable recommendations for the establishment of quarantine.

3. Meat and Dairy Inspection:

(*a*) Inspection for soundness of meat at the time of receipt, while in storage and at issue.

(*b*) Inspection for compliance with Government specifications on receipt.

(*c*) Inspection of Quartermaster storehouses and refrigerators and the methods of operating and handling of food therein.

(*d*) Inspection of abattoirs, slaughter houses, butcher shops, branch storehouses and packing houses, handling meats which may be sold to troops direct or through the Supply Officer.

(*e*) Ante-mortem and post-mortem inspection for soundness and suitability of animals slaughtered for human consumption.

(*f*) Inspection of dairies and milk cows and dairy products.

4. Laboratory Service:

(*a*) Laboratory diagnosis.

(*b*) Preparation of biologics, including mallein and tuberculin.

(*c*) Laboratory diagnostic tests for glanders.

5. The special duties of an Army veterinarian: The purchase, mobilization and transportation of animals, as well as the evacuation of disabled animals and their care during evacuation in order that they may not encumber troops.

Considering the curriculum in its relation to the preceding outline, the course in anatomy should devote sufficient attention

to the surgical anatomy of the horse. It should also give instruction on the location of the principal lymphatic glands of all the food-producing animals.

The professional care and treatment of sick animals may be considered as adequately provided for by the regular courses in medicine, surgery, materia medica and therapeutics, with special attention devoted to communicable diseases. Clinical practice should insist upon the necessity of keeping careful and correct records of all cases. In the Army increasing attention is being devoted to the importance of military records.

In the course on Feeds and Feeding, not only the balanced ration, food values and the formulation of rations should be considered, but also inspection of forage and grain, with proper attention to concentrates and roughage from a military standpoint. A veterinary officer is frequently called upon to pass expert opinion upon the kind, quality and feeding value of forage and grain. In addition to his knowledge of this material native to our own country, he will in many cases find it advantageous to possess information relative to the forage of our insular possessions and even of some foreign countries. Qualification as a forage inspector is important, and deficiency in this respect is by no means infrequent. Ability in this direction is perhaps quite as essential as passinig judgment on meats and meat products or in judging animals for soundness. The consideration of poisonous plants may well be taken up in connection with forage or as a part of the course in materia medica.

In the course in Breeds and Breeding, in addition to the proper care of the stallion, mare and foal, attention should be paid to the types fitted for cavalry, artillery and heavy artillery work. In conjunction with this course, or as a separate course, there should be instruction in judging and examination for soundness and determination of the type of work for which the animal is best fitted.

Unless supplemented by separate courses, the instruction in veterinary hygiene and sanitation should cover the location and construction of veterinary hospitals and stables with respect to drainage and ventilation; stable management; methods of feeding, watering and grooming; inspection of bedding and of corrals and picket lines. Certain general principles should receive universal acceptance. The advisory service of veterinarians is of little value if there is disagreement upon fundamentals.

The course in horse-shoeing is very important, and special attention should be given to pathological conditions affecting the foot. As a rule, a large percentage of animals are rendered non-effective because of foot trouble, due primarily to shoeing.

In army service especially a veterinarian should be well qualified in horsemanship. The veterinary training camps have demonstrated that a rather large percentage of recent graduates have been deficient in this important matter. Practical training along this line is urgently needed, and the veterinary college should offer opportunity to the student to become thoroughly familiar with all that pertains to the use of the horse, including harness, bits, and saddles, driving and work with the rope, making rope halters, tying, etc.

A course in equitation, considered in a restricted sense as limited principally to riding, is perhaps of doubtful utility in the college curriculum, because on the one hand the facilities in this regard may be lacking or inadequate, and because, unless the course is under the direction of one familiar with Army technique and methods, the student may be obliged to unlearn much of the instruction given him when later he comes in actual contact with the methods of the service. Postponement of this work until practical and correct procedure can be developed, after entering the Army, is probably the more advantageous plan for all concerned.

The course in meat and dairy inspection should be supplemented so far as possible by practical demonstrations at the abattoir, with due consideration for ante and post-mortem examinations. The milk and dairy inspection should include practical instruction and work in stable sanitation; tuberculin testing; the production of milk, its care, shipping and conversion into dairy products. Matters pertaining to Government specifications and applicable to Government conditions may, perhaps, be taken up more advantageously after entering the service.

Laboratory practice: A laboratory supplied with proper equipment should encounter little difficulty in furnishing adequate, practical instruction in laboratory diagnosis, with due attention to the production of mallein and diagnostic tests for glanders.

The subjects referred to under group 5, relative to the duties of an Army veterinarian, the purchase of animals, mobilization and transportation, etc., can best be presented by one who has

had military experience. Other topics, bearing on details of a character special to Army service sufficient to cover a course extending over a few weeks, could be included in this group. Lantern slides may be arranged to illustrate some of these special features and this course be made obligatory for those contemplating Army service. For the presentation of such a course, it might be possible that an Army veterinarian could be detailed for the purpose.

A course in Military History should also be of interest. Although data relative to the recent war will be available, there doubtless is also existing much information of value relative to the Civil War, Spanish-American War, and experience on the Mexican border, which, if not collected and properly arranged will be entirely lost for future use.

It has been the aim to outline the subjects which it is believed will benefit and especially equip the young veterinarian so that upon entering the Army there will be a minimum loss of momentum and a speedy development of efficiency along the lines peculiar to the service. No attempt has been made to outline courses in minute detail, as the facilities, equipment and environment of the college should develop these details according to the best judgment of the faculty. In the event of the establishment of a veterinary school in connection with the Army Medical School for the training of young officers, it is believed that the curriculum as outlined will nevertheless be of much value. If such a training school is not established, the need for such a curriculum is even more manifest.

As applied to the curriculum of the New York State Veterinary College at Ithaca, N. Y., it is noted that the department of Anatomy already offers a course in surgical anatomy. If not already included in other courses, special attention should be given to the location of the lymphatic glands in the food-producing animals.

The professional care and treatment of sick and injured animals are adequately provided for in the courses arranged for that purpose.

In the courses in feeding and breeding it is recommended that they include or be sufficiently extended to cover the military view of the subjects as mentioned on page 532.

The course in Hygiene as now given for a period of only one hour per week for one term, dealing with the general principles of the subject, seems inadequate. To the Army veterinarian this

is a major subject, and the course should be enlarged to include those features which are of special value from a military standpoint. In this connection it should be noted that if the proposed battery of artillery is established at Cornell, it will offer an excellent opportunity for experience in stable management, sanitation, etc., of much practical benefit to the students, if suitable arrangements can be made.

The course in horseshoeing is very important and, as now given, is probably adequate if sufficient attention is given to its relation to the pathological conditions of the foot.

Although a course in judging, or animal mechanics, is not listed in the curriculum, such a course is available in the College of Agriculture. If this course can be modified to include a consideration of types suitable for Army purposes, including examinations for soundness, it should be included as a required subject in the veterinary course.

As already pointed out, the subject of horsemanship is of primary importance to a veterinarian whether he enters the Army or not. While some of the details, properly included under this term may be scattered through some other courses, it is a question well worth considering if matters pertaining to this subject should not be arranged in an orderly and systematic way and presented as a separate course.

Like the course in Hygiene, the subject of Meat and Dairy Inspection is of major importance to the Army veterinarian. The time alotted to it seems insufficient, in view of the responsibility placed upon the veterinary officer. It is recognized, however, that after entering the service opportunity is given for further preparation in this work, especially in connection with Government specifications.

Laboratory Practice: As for laboratory diagnosis, biologic products, production of mallein and tuberculin and the technique associated with their use, it is believed that the equipment, facilities and methods of the college are more than adequate for the requirements of an Army veterinarian.

As previously mentioned, the subjects in group 5 relative to the duties of an Army veterinarian, embracing features which are peculiar to military service, can be presented to the best advantage only by one who has had rather extensive experience in the service. Amplified by the use of lantern slides and possibly by some practical demonstrations, such a special course would be of exceeding value. With a competent Army Veterinarian de-

tailed to conduct the course, it is entirely practicable, and it is recommended that an effort be made to put it into effect.

For the prestige of the veterinary profession, the good of the service, and for the benefit of the officer himself, the Army Veterinarian should be an authority in his field, highly qualified on all matters pertaining to the Army animals. To this end, and for this purpose, the veterinary college should lend its earnest effort.

LT. COL. R. J. STANCLIFT.
MAJ. R. J. FOSTER.
MAJ. A. L. MASON.
CAPT. W. E. MULDOON.
MAJ. P. A. FISH, *Chairman.*

A CHRONIC POX-LIKE INFECTION IN GOATS AND ITS SUCCESSFUL TREATMENT.*

R. V. STONE and C. W. FISHER.†

In these days when food animals are so important, it behooves us as veterinarians to do what we can in the line of conservation of such animals. The goat is coming into importance so rapidly in this and other countries that some of us are often called to treat or advise in the care of this animal. It is hardly necessary to mention the fact that the goat will solve the sanitary milk supply problem for many families as well as furnishing a milk more nourishing and more easily digested than any other.

Of the ordinary ailments of the goat the veterinarian should readily understand them after a little thought. One disease, however, appears to be quite prevalent in this state and offers a problem not easily solved when first seen. The authors of this paper believe that it will become of economic importance to the goat industry, inasmuch as the persistent character of the disease causes a marked decrease in milk production as well as a great loss in flesh of animals affected. It is the result of meeting this condition in the field that has led to the work we are about to describe. It is our hope that in presenting this we may benefit to some extent the suffering goats and the perplexed veterinarians who may at some time confront this disease.

* Read by R. V. Stone before the California State Veterinary Medical Association and Southern Auxiliary at Fresno, June 2 and 3, 1919.

† C. W. Fisher, a practitioner of San Mateo, California, conducted the field work, and R. V. Stone of the Cutter Laboratory conducted the bacteriological examination and preparation of Bacterins.

It was in the early spring of 1917 that an outbreak in a herd of goats was brought to our attention, and subsequent developments resulted in an extensive amount of work for both Dr. Fisher and myself. We very soon concluded that it would be of interest to determine, if possible, the contributing factor to the persistent type of infection we found existed.

CASE REPORTS.

Case No. 5922, a 4-year-old, kidded Jan. 26, 1917, at 142 days. Three buck kids all lived, but were not very strong. Although the birth was plainly premature, she seemed not to suffer and had at first a normal flow of milk. About two weeks after kidding, she became stiff in her joints, loss of appetite, loss of milk flow, coat rough, staring, and eyes sunken. No eruptions appeared on the skin, however. On March 19th a large swelling on the sternum was noticed and it was lanced, quantities of pus being removed. Other abscesses were found in the same region. Pus was taken from one of these abscesses by Dr. Fisher on March 29th, which was examined culturally, yielding a pure staphylococcus. Of her three kids, one soon appeared to droop and eruptions containing pus covered the whole abdominal region and inside the legs. His knees were swollen and when lanced emitted the same pus. Postules appeared between his toes so that he was unable to walk. With care and treatment by the owner he recovered, although was undersized. The second triplet had the knees affected, also an abscess on the nose that had to be opened. No pustules were seen and he made a good recovery. The third triplet had no trouble. The mother was treated with Mixed Goat Bacterin, with quick recovery.

Case No. 5993, a doe presenting subcutaneous nodular-like swellings. Some of these had a tiny opening through the skin. By pressing nodules so opening, a thick caseous material would exude. A cultural specimen was taken by clipping the hair, disinfecting after washing and excision of the material with a sterile scalpel. The cultures disclosed a pure staphylococcus, This animal has remained untreated for almost two years with no lessening of the number of nodules. She is now undergoing bacterin treatment.

Case No. 6097, was a young doe that had been diseased for over a year. The original owner had used various local dressings without avail. Finally, discourged and not wishing to have

the animal on the premises, because of danger of infecting other goats, the doe was given to a family some distance away, who desired it. The new owners also tried to remedy the condition, with no results. In October, 1917, specimens were taken and the staphylococcus was present pure. Bacterin was prepared and treatment begun in November. In December the animal had made a complete recovery, which has been permanent up to June, 1919.

Case No. 6055, a 5-months-old kid, in November, 1916, developed a rheumatic trouble; the joints becoming stiff and the animal rapidly became almost helpless, knees swollen, ankle joints weak, ears covered with small eruptions. At times she had to be lifted to her feet and coaxed with the best of food to keep her alive. Only one or two injections of the bacterin were given, with the result that the animal was completely recovered. However, two years later, she has developed a nodular stage and treatment is now being conducted in which we will administer several doses of the bacterin.

Case No. 5923, was a 2-year-old pürebred Toggenburg doe. She developed pustules soon after kidding. From these pustules we isolated a staphylococcus in pure culture and after injecting a bacterin prepared from a mixed lot of goat strains, recovery soon was accomplished.

Case No. 6246. In July, 1917, a doe, some seven years old, broke out with pustules. Excellent care and treatment was given by the owner with varying success. In March, 1918, Dr. Fisher was called, and recognized the above-described disease. Pus was taken, from which the same organism was isolated. After a few doses of autogenous bacterins were given, recovery was very rapid. In May, 1918, the doe looked in excellent condition and pregnant. About the time of termination of pregnancy in July, she became very sick, not eating anything for five days and breaking out with large areas of confluent pustules. There was a bloody vaginal discharge but no pregnancy. Later the owner gave us the goat for investigation. Autogenous bacterin soon brought her back to condition. In December, 1918, she developed a light attack again and during January to March, 1919, a heavy treatment of bacterin was given. Now she is in fine condition and gives hopes of being productive. No pustules or nodules have been observed since treatment started in January. None of these cases presented pictures resembling those observable in Takosis.

Our first impression was that the cases presented lesions resembling those observed in cow-pox. The skin was covered with many scabs averaging one-quarter inch in diameter, or coalescent to include large areas. The hair was in tufts and the animals showed evidences of marked irritation. These pustular eruptions were most frequently present on the udder, thorax, on the back near the tail, and on the inner surface of the limbs. If one lifted the scab, there was disclosed to view a small crater-like depression about one-quarter inch deep, highly inflamed, and the cavity contained a small quantity of creamy pus, somewhat tenacious in consistency, from which we later made bacteriological examinations.

At the time of our first visit we inquired into the history of the cases and learned that the condition had been introduced from the southern part of the State, and Arizona, from which places this herd was partially built up. The disease spread rapidly through a large herd, especially affecting the young does soon after freshening. In this way much loss was caused in milk flow and flesh. This new stock arrived in the summer of 1916 and it was not until March, 1917, that the cases were brought to the attention of Dr. Fisher. During the interval between the summer of 1916 and March, 1917, the condition had persisted. We were informed that experimental inoculation had been attempted by scarifying the udder and rubbing vesicular contents on the scarified area. This apparently would render the outbreak on the udder less severe, but would not confer complete immunity. Local antiseptics were resorted to with the result that the particular lesions treated would heal, but the condition would break out soon on some other portion of the body. Various types of lesions were observed and treatment was resorted to in each. The various forms observed were three in number.

The first was the initial appearance of the pustule. This form would continue for three to four weeks when the majority of the cases would recover. But in some cases recovery did not take place, and it was these chronic cases that the authors had occasion to observe. Then here, besides the skin eruptions, we would frequently find a second form consisting of a subcutaneous swelling which varied in size from a small shot to a glandular-like swelling the size of a walnut. Incision of these swellings disclosed a caseous pus without odor which would yield upon cul-

turing a Gram positive staphylococcus resembling in all respects the organism isolated from the pit of the pustule. These subcutaneous swellings were usually present on the face, back, sides, and inner surface of the limbs. The larger nodules were visible from a distance; the smaller ones being readily felt when stroking the hair.

A third condition observed and which readily yielded to bacterin therapy was arthritis involving the forelimbs particularly. At some times it would be so severe that the animals would have to be lifted manually to get them on their feet. Abortions occurred in many cases and sterility resulted in certain cases. One of these apparently sterile animals was observed closely and when brought into good condition following gradually increased injections of bacterins, was bred and appears to be pregnant at the time of this writing. We have not worked with the abortion cases to any extent, but believe there is a connection between the frequent abortions occurring in infected herds and the organism we have studied. The usual type of infection referred to us was benign in character, only two animals showing a malignant form of the condition. These consisted of two kids whose heads were caught in their feeding stanchions with a result that the tissues of the neck were badly bruised, but the skin was not broken. The area affected became swollen and later edematous. The temperature reached 107 degrees Fahrenheit. Both kids evidenced great suffering and prostration. They were killed to relieve their further suffering. Dr. Fisher conducted a thorough post-mortem of these animals and found the following condition present: There were no lesions other than locally, the tissues of the neck region were extensively hemorrhagic and edematous. In the auditory canal was a caseous pus. In the lymphatic glands of the throat was a marked congestion. Cultures were made from the glands, auditory canal and spinal fluid. In all of these a pure growth of the staphylococcus was obtained. Catching the heads in the stanchions was believed to be the immediate cause of the swelling, yet the organism was in the system apparently dormant but waiting for a traumatic area in which to localize.

It was believed that if we were contending with true goatpox one attack should confer an immunity to the disease, but this did not appear to be the case. It was therefore decided that an attempt to isolate organisms from the pus contained beneath the cap of the scab would be of interest. Accordingly several speci-

mens were taken from various goats and forwarded to the laboratory in Berkeley. In all of these specimens the same organisms were isolated in pure culture. In all of our work the utmost care was employed in taking specimens to prevent the entrance of contaminating influences. Sterile instruments were used to lift the cap after the area had been clipped, washed and disinfected. The small amount of pus was then collected on a sterile swab and immediately returned to a sterile test tube. Cases that had not been treated, but whose histories informed us that the condition had been present for over a year and a half, as evidenced by continual nodules on the body, yielded positive cultures from the cheesy-like pus excised.

BACTERIOLOGY OF THE DISEASE.

Inasmuch as the organisms isolated were culturally and morphologically similar to each other it was decided to employ autogenous bacterins prepared from them to determine if these strains were of therapeutic value. These bacterins were prepared by the usual methods. The cultures were first examined for purity. The organism is a staphylococcus having an orange pigment and producing marked hemolysis on uncooked rabbit's blood. This quality of causing hemolysis is retained even in cultures over two years old. At first the organisms stained unevenly by the Gram method, but later became stabilized, staining readily by Gram's method. Once the purity of the cultures was proven, sub-cultures were made and incubated 24 hours at 37.5° C. They were then scraped in physiological salt solution and sterilized at 56° C. for 30 minutes. They were preserved with 0.5% phenol and diluted to a standard of 500 million organisms per milliliter. After this they were tested for sterility and bottled. At first analogous strains were used on the respective cases, but later on the strains were incorporated into a mixed bacterin with equally good results as compared to the autogenous preparations.

We endeavored to demonstrate the specifiicity of the organisms by experimental inoculation of rabbits, guinea pigs and normal goats. A heavy suspension of fresh cultures was made, using physiological salt for the diluting medium. With an intradermal tuberculin needle small quantities of the inoculum were injected underneath the skin. In the case of the rabbits and guinea pigs, only a slight traumatic inflammation was observed. This disappeared within 24 hours. However, in the goats marked swellings resulted, which later became necrotic and

large patches of skin sloughed away. The areas from which these sloughs came, persisted raw and necrotic. Healing could not be induced even though antiseptic dressings were applied frequently. A few weeks later it was decided that the bacterin should be used to endeavor to remedy the condition. This was done, with a resulting rapid and complete recovery.

Agglutination tests were then attempted, using normal goat serum for controls and the serum from goats naturally infected. The positive cases agglutinated in dilutions of 1-400 while the normal sera did not agglutinate even at 1-10 dilutions.

Four cases of transitory infection by the pustular form in the case of the human have been reported to us. These persons were engaged in the care and milking of the animals infected. One of these parties had been vaccinated against smallpox several times, yet contracted the pustular type of infection twice at intervals of a year.

So far as the area in which this condition is found is concerned, we have personally taken observations of five herds, three of which are situated at wide limits from each other, the remaining two being about two miles apart. From these five herds we obtained the same organism, as judged by its morphology, pigment and hemolytic properties. In the goat journals are numbers of queries from many sections in which the conditions described simulates these we have observed. We believe the condition is quite widespread.

Recently Professor Ivan C. Hall of the University of California visited one of these herds with us. The chronic cases in this herd had been under bacterin treatment two years previously. The animals have been free from disease since then. At the time of our visit the goats were in the best of condition, with a yield of 25 gallons of milk each day from 32 goats. Only two animals showed any infection. These had the nodular form. They had not been treated previously. Specimens were taken and divided in two portions, one of which Professor Hall examined and we the other. Working independently we both isolated the staphylococcus.

SUMMARY.

1. A condition in goats, benign in character, but of economic importance through loss in milk production and flesh, has been observed. Lesions in early stages resemble goat-pox.

2. Whether true goat-pox or a condition having lesions simulating those observable in goat-pox has not been determined.

3. However, a pure Gram positive staphylococcus having an orange pigment, and producing marked hemolysis on uncooked blood agar has been isolated from every specimen taken.

4. Bacterins prepared from this organism produce a rapid recovery in cases affected.

5. This therapeutic value may be specific or non-specific, but the organism has been demonstrated as being particularly virulent for goats, but non-virulent for guinea pigs and rabbits.

6. Three distinct forms of infection have been successfully treated with bacterins. These forms are:

a. Arthritis.

b. Exanthemata.

c. Subcutaneous multiple abscesses.

7. Cases in which bacterin therapy is not employed do not recover rapidly, but may persist at least a year and a half.

STUDIES ON ANTHELMINTICS.*

II. THE ANTHELMINTIC AND INSECTICIDAL VALUE OF CARBON BISULPHIDE AGAINST GASTRO-INTESTINAL PARASITES OF THE HORSE.

MAURICE C. HALL, Ph. D., D. V. M.
MORGAN J. SMEAD, V. S., B. V. Sc.
CHARLES F. WOLF, D. V. M.
Biological and Research Laboratories, Parke, Davis & Co., Detroit, Mich.

By critical experimental methods, *i. e.*, treatment followed by careful examination of the manure and post-mortem examination, it has been found by Hall (1917) that carbon bisulphide is apparently 100 per cent effective against bots; by the same methods, it has been found by Hall, Wilson and Wigdor (1918) that some of the common anthelmintics are not adequately effective against ascarids in the horse, even such drugs as oil of chenopodium, highly ascaridal for ascarids in other hosts, falling far short of 100 per cent efficacy. Using these same critical methods, we find that carbon bisulphide, in addition to being 100 per cent effective in removing bots, is almost that effective in removing ascarids. This drug has been used heretofore against ascarids

* Read before the Southeastern Michigan Veterinary Medical Association, Detroit, Mich., April 9, 1919.

in the horse, but in the absence of critical tests, its real efficacy was a problematical quality. We are now able to report that in carbon bisulphide we have a dependable remedy for the refractory ascarid of the horse. This information fills a distinct gap in our knowledge of dependable treatments for parasites of the horse, and in connection with the findings of Hall, Wilson and Wigdor (1918) to the effect that oil of chenopodium, properly used, is approximately 100 per cent effective against strongyles, cylicostomes and pinworms in the horse, it establishes the topic of anthelmintic treatment for the common parasites of the digestive tract of the horse on a sound basis of tested and dependable drugs.

Our method was the same as that used by Hall, Wilson and Wigdor. The horses were dosed by, and the fasting, feeding and care of manure supervised by, one of us (Smead). The examination of the manure for worms and bots passed and the postmortem examination of the digestive tract were made by Hall, Smead and Wolf, assisted by J. R. Stafford. No effort was made to detect cylicostomes in the manure or to count them postmortem. However, if cylicostomes had been present in the manure to any extent they would probably have been detected, and it is our opinion that practically none were passed.

Food was removed from 8 horses at noon, March 10, 1919, and the animals were given their first, or their only, treatment with carbon bisulphide in hard capsules about 8:30 the next morning. No purgatives were given. In view of the new data relative to the time required for dead bots and worms to pass from a horse under these conditions, we give the protocols rather fully.

Horse No. 1094 was given 6 drams of carbon bisulphide in 1 dose. On the succeeding days, in their order, this horse passed the following: 1 bot, 0 ascarids; 2 bots, 0 ascarids; 58 bots, 1 ascarid; total 61 bots, 1 ascarid. The horse was killed the third day after treatment and had 105 dead bots and 5 dead ascarids in the large intestine on their way out. The drug removed 166 bots and 6 ascarids, leaving none in the stomach or small intestine. This horse had 85 pinworms, hundreds of *Strongylus* spp. and thousands of *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. (We assume from the number of cylicostomes left, together with the failure to remove *Strongylus* and pinworms, that the treatment was an entire failure against cylicostomes,

even though the manure was not closely examined to see if any of these were passed.) The stomach and small intestine were normal.

Horse No. 1093 was also given 6 drams of carbon bisulphide in 1 dose. On the succeeding days this horse passed bots as follows: 0 bots; 8 bots; 70 bots; 77 bots; 36 bots; 48 bots; 33 bots; 5 bots; 2 bots; total, 279 bots. This horse passed 2 ascarids on the third day after treatment and 2 or 3 at a later day; owing to a misunderstanding, exact records were not kept for these worms. The horse was killed the ninth day after treatment and had 2 bots in the double colon and no ascarids anywhere. This horse had 1 pinworm, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. The stomach showed a healing inflamed area in the cardiac portion.

Horse No. 1092 was given 4 drams of carbon bisulphide at 1 dose and this dose was repeated 2 hours later. On the succeeding days, in their order, this horse passed the following: 0 bots, 0 ascarids; 0 bots, 1 ascarid; 0 bots, 4 ascarids; total 0 bots, 5 ascarids. The horse was killed the third day after treatment and had no bots anywhere; it had 2 live ascarids in the small intestine and 38 dead ones in the large intestine. There were 9 *Strongylus* spp., some *Cylicostumum* spp. and no pinworms. The treatment was therefore over 95 per cent effective against ascarids and 0 per cent effective against *Strongylus* and *Cylicostomum* spp.; no data regarding bots and pinworms, as these parasites were not present. Cardiac stomach was inflamed and showed adherent mucous exudate.

Horse No. 823 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days this horse passed the following: 1 bot, 0 ascarids; 0 bots, 2 ascarids; 1 bot, 10 ascarids; 1 bot, 4 ascarids; 0 bots, 6 ascarids; 0 bots,3 ascarids; 0 bots, 0 ascarids; 0 bots, 1 ascarid; total 3 bots, 26 ascarids. Subsequent to the eighth day after treatment, no bots or ascarids were passed. The horse was killed on the seventeenth day after treatment and had no bots or ascarids anywhere. There were hundreds of *Strongylus*, thousands of *Cylicostomum* and no pinworms. The treatment was, therefore, 100 per cent effective against bots and ascarids, and 0 per cent effective against *Stron-*

gylus and *Cylicostomum*. In passing, it may be noted that the small number of bots present in this horse is correlated with the fact that this animal had not been on pasture the previous summer, but had been kept in the stable or allowed in a bare lot for exercise. The inflammation of the gastric musoca, following treatment, had almost entirely subsided.

Horse No. 1091 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days this horse passed bots as follows: 0, 7, 13, 6, 4, 2, 2, 0, 1, 0, 0, 0, 0, 0; total, 35 bots. This horse also passed 3 ascarids, but the exact date was not recorded. The horse was killed the fourteenth day after treatment and had no bots or ascarids post-mortem; it had hundreds of *Strongylus* spp. and numerous *Cylicostomum* spp., but no pinworms. The treatment was therefore 100 per cent effective against bots and ascarids, but 0 per cent effective against *Strongylus* and, apparently, *Cylicostomum*. There are no conclusions regarding pinworms, as these were not present. There had been some inflammation in the cardiac stomach, but this had almost entirely subsided at the time of necropsy.

Horse No. 897 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days, this horse passed no bots. At some date it passed 1 or 2 ascarids, but, owing to a misunderstanding, no records of the number of worms or the date were kept. The horse was killed on the fourteenth day after treatment and was found to have no bots. There was 1 live ascarid in the small intestine. The horse had 4 pinworms, numerous *Strongylus* and some *Cylicostomum*. The treatment was not entirely successful against ascarids in this case, removing 1 or more and leaving 1. This is probably due to the worm being in the lower ileum and the drug being largely absorbed before reaching the site of the worm. The treatment was 0 per cent effective against pinworms, *Strongylus* and, apparently, *Cylicostomum*. There are no conclusions in regard to bots, as there were none present. This freedom from bots is correlated with the fact that this animal had been kept off pasture the preceding summer. The stomach of this animal showed evidence of an inflammation, in the cardiac portion, that had almost entirely subsided.

Horse No. 1100 was given 3 doses of 3 drams each of carbon bisulphide at 1-hour intervals. On the succeeding days this horse passed the following: 0 bots, 0 ascarids; 31 bots, 4 as-

carids; 58 bots, 2 ascarids; 29 bots, 0 ascarids; 14 bots, 0 ascarids; 13 bots, 0 ascarids; total 145 bots, 6 ascarids. The horse was killed the sixth day after treatment and had 15 dead bots in the large intestine and no ascarids anywhere. There were 4 pinworms, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. A considerable portion of the cardiac stomach was highly inflamed.

Horse No. 1106 was given the same treatment, 3 doses of 3 drams each at 1-hour intervals. On the succeeding days this horse passed the following: 0 bots, 0 ascarids; 17 bots, 1 ascarid; 12 bots, 1 ascarid; 7 bots, 0 ascarids; 6 bots, 0 ascarids; 1 bot, 0 ascarids; 0 bots, 0 ascarids; 0 bots, 0 ascarids; 0 bots, 0 ascarids; 1 bot, 0 ascarids; total 44 bots, 2 ascarids. After the tenth day no parasites were passed. The animal was killed on the seventeenth day. One dead bot was found in the double colon and no ascarids anywhere. There were numerous *Strongylus*, innumerable *Cylicostomum* and no pinworms. Treatment was, therefore, 100 per cent effective against bots and ascarids, and 0 per cent effective against *Strongylus* and, apparently, *Cylicostomum*. The inflammation of the gastric mucosa had almost entirely subsided.

A consideration of the foregoing shows the following:

Carbon bisulphide has a dependable efficacy of approximately 100 per cent against bots and ascarids, the two common and important parasites occurring in the anterior portion of the digestive tract, *i. e.*, the stomach and small intestine, of the horse. In our animals, the bots were mostly *Gastrophilus nasalis*, with a few *G. hemorrhoidalis;* the ascarids were the common *Ascaris equorum (A. megalocephala)*. In our experiments, it was uniformly 100 per cent effective against bots, removing all of 690 bots from the 6 infested animals, and usually 95 to 100 per cent effective against ascarids, removing (approximately) 91 of 94 worms from the 8 infested animals, or almost 97 per cent.

Carbon bisulphide gives as good results in 1 6-dram dose as in 2 4-dram doses or 3 3-dram doses, and it is likely that the smaller sum total of drug in the one dose is to be preferred to the greater total in several doses, especially as the gastric lesions seem less pronounced with the 1 dose. It is quite possible that further experiment will show that a single dose even smaller than 6 drams will be adequate. Dove (1918) found that young bots

could be killed by carbon bisulphide in 45 minutes, while last-stage larvæ required almost 3½ hours, *G. intestinalis* being more resistant than other species. The question as to whether carbon bisulphide in one dose remains in the stomach long enough to remove the bots, and perhaps remains as much as 3½ hours, would seem to be answered in the affirmative by the sucess of our 1-dose treatment.

Carbon bisulphide given without purgation will remove the bots, but they will usually not be found in the manure for the first 24 hours after treatment, and the maximum number are apt to be in the manure of the third day, and may be in that of the fourth day after treatment. Dead bots may be passed for 10 days and others may still be present in the large intestine 17 days after treatment. Where purgation is employed, bots may come away in the first 24 hours, according to Dove (1918), usually the following day, however, and may come away for 5 days, according to the findings of Hall (1917) and Dove (1918).

Ascarids usually come away on the second and third day, but may come away as late as the eighth day.

Carbon bisulphide is of no value against worms in the posterior portion of the digestive tract, the cecum, colon and rectum, *i. e.*, against pinworms, *Strongylus* and *Cylicostomum*. This is perhaps due to the rapid absorption of the drug in the stomach and small intestine, and this may account for the occasional escape of an ascarid located in the lower portion of the small intestine. The simultaneous administration of linseed oil might serve to carry the carbon bisulphide in solution down the intestine more rapidly, increasing its efficacy against ascarids. Whether it would cause the removal of any worms from the large intestine is doubtful. Hall (1919) has reported two experiments where horses given a 20-mil dose of carbon bisulphide, or two such doses at 2-hour intervals, followed in 1½ to 2½ hours by 800 mils of linseed oil, entirely failed to remove any strongyles.

In this connection, it may be said that the carbon bisulphide is soluble in oils, but is practically insoluble in water; Dove (1918) is in error in stating: "The carbon bisulphid, being soluble in water, evidently reaches all portions of the stomach, either as a gas or in solution." A common laboratory test for iodine is that employing a discrete undissolved bubble of CS_2 at the bottom of an aqueous solution.

Obviously, adequate anthelmintic treatment for removal of all the common species of worms and bots from the horse would require consecutive treatments with carbon bisulphide and oil of chenopodium, the two anthelmintics now known to be dependable for the purpose.

The lesion due to carbon bisulphide given in hard capsules consists in inflammation in the cardiac portion of the stomach, usually over an area the size of a man's hand or larger. This inflammation, when present, subsides almost entirely in the course of two weeks. The fact that horse No. 1094 had a normal stomach on the third day after treatment with 1 6-dram dose, suggests that this single-dose treatment occasions less local damage than repeated doses; certainly the amount of toxic drug absorbed is less.

REFERENCES.

DOVE, W. E. 1918. Some biological and control studies of *Gastrophilus haemorrhoidalis* and other bots of horses. U. S. Dept. Agric. Bull. 597, April 9, 52 pp., 5 pls., 4 text figs.

HALL, MAURICE C. 1917. Notes in regard to bots, *Gastrophilus* spp. J. Am. Vet. Med. Assn., v. 5 (2), Nov., pp. 177-184. 1919. Practical methods of treatment for worm infestation. J. Am. Vet. Med. Ass., v. 8 (1), Apr., pp. 24-45, 1 fig.

HALL, MAURICE C.; ROBERT H. WILSON; and MEYER WIGDOR. 1918. The anthelmintic treatment of equine intestinal strongylidosis. J. Am. Vet. Med. Ass., v. 7 (1), Oct., pp. 47-55. 1918. Some notes on the treatment of equine ascariasis and oxyuriasis. J. Am. Vet. Med. Ass., v. 7 (1), Oct., pp. 56-57.

Dr. R. O. Suddath is now located at Marietta, Ga., instead of Auburn, Ala.

Dr. B. F. Davis, state veterinarian, has his headquarters at Cheyenne, Wyo.

Dr. L. A. Danielson is now located at Santa Rosa, Calif. His former address was Madera, Calif.

Dr. D. L. Allen, Resident Secretary for Alabama, is now located at Prattsville. His former address was Auburn.

CLINICAL AND CASE REPORTS.

VERMINOUS CATTLE.

By E. HORSTMAN, Baton Rouge, La.

Internal parasites infesting live stock are the bane of the southern cattle owner and stock raiser in the lowlands and marshy ranges of the south, when infection once gains a start on such pasturage. Burning off the range is impractical owing to the extensive area and wooded portions, since the entire pasturage acreage is generally given over to the stock, to roam at will, it is all then considered infected on any one farm. There is no free part to which the stock could be moved after treatment, without entailing the expense of renting other premises than your own, until such time that the infected range could be made clean by rotation.

Sheep raising under these conditions is a hazardous undertaking and is responsible for there not being more of this industry in a country that otherwise would make this a very profitable investment. Hogs likewise are found, in many so-called outbreaks of hog cholera, to be suffering from infestation of intestinal and kidney parasites.

Cattle have suffered less. However, a number of owners having reported illness in their herds, on investigation they were found to be infested with the twisted stomach worm (Hæmonchus contortus).

Figure 1 is that of a three-year-old heifer, "Hereford," treated for twisted stomach worms, "Hæmonchus contortus." Life prolonged for about five months. Post-mortem showed gastro-enteritis, a deep red and thickened stomach membrane.

By application of the copper sulphate treatment as prescribed by the Bureau of Animal Industry: 1 pound crystallized bluestone, powdered, dissolved in 9½ gallons of warm water, used as a drench, twice, 12 days apart, 7 ounces to yearlings, 16 ounces to mature cattle, has been found effective, when the cattle could be moved to new pasturage after treatment.

Cattle suffering from this parasite are nearly always in such a debilitated state that the treatment with copper sulphate is very drastic and more than they can withstand. Restoration by tonics and stimulants from the enfeebled condition is first in order.

At the "W. C." ranch, Lafourche Parish, La., which lies about nine feet above sea level, the experience with the "Hæmonchus contortus" and other internal parasites, among them the whip-worm, "Tricocephalus affinis," the lung worm, "Dictyocaulus viviparous," tapeworms and the grub larvæ have proven extremely costly to the owners.

Fig. 1.

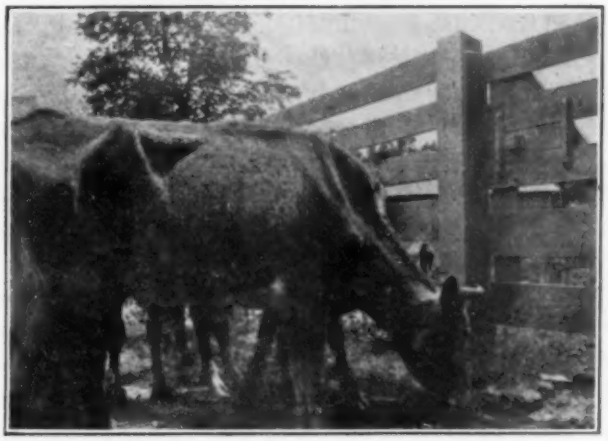


Fig. 2.

Figure 2 shows extreme emaciation of a four-year-old native cow, Jersey, found down and in dying condition, was destroyed. On post-mortem the whip-worm, "Tricocephalus affinis," and innumerable grub larvæ were found, with inflammation of true stomach and smaller intestines.

This ranch contains about 2500 acres, over which approximately 1000 head of cattle, "Herefords," have free access. This ranch was stocked about one year past with white-face cattle from Texas. Trouble soon began and cattle were dying at the rate of 4 to 5 each week. A significant point noticed was: The sick were confined to the last lot imported; the others, of the first shipment, apparently were not affected, indicating almost conclusively that the trouble, whatever it was, came with the shipment and was not a native disease. The staggering gait, swelling under chin, emaciation, membranes anæmic, copious evacuations, no temperature, appetite good though variable, pointed to worms. On post-mortem the previously mentioned parasites were found in profusion, and the animals suffering from Verminous Bronchitis with lungs congested, others from gastro-enteritis, due to the twisted stomach worm. All fats, heart, kidney, mesenteric and extending to orbital fossa were of jelly-like consistency, a veritable cachectic condition. The question arises here: Why are these cattle not showing above symptoms at their native heath in Texas? If they brought the infection with them, which it is claimed they did, and since the "W. C." ranch had no cattle on it for years prior to the present stocking, the infection could not have been present upon their arrival, to be picked up. Does acclimation changes have anything to do with verminous virulence? Concluding it does not, there must be some mistake as to the history of origin of these parasites.

Every veterinarian of note for miles around has passed on these cattle and held post-mortems, and as one of them characteristically writes the following: "Nothing of additional information was found. Worms were present in every case, all kinds of worms — lung, stomach, round and tapeworms. The animals are still dying at the rate of one a day." This was the mortality at the time; however, the end of deaths has been apparently reached, as there were but four left of the sick lot when last seen; all of the herd otherwise looking fat and well.

Some have recovered, others recovered apparently, had a recurrence and died; most of them lingered along from two weeks to five months and eventually died. The copper sulphate treatment was applied and aided the weaker ones to hastily make their exit from this mortal coil.

STERCOREMIA OF SHEEP.

E. A. Bruce, Agassiz, B. C.

Stercoremia is defined in Dorland's dictionary as a "toxic state occasioned by poisons absorbed from retained feces."

This term is believed to more correctly describe a condition that has heretofore been called preparturient eclampsia or post-partum paralysis. Such a condition was recently investigated in a flock of sheep in which 92 fatalities occurred.

HISTORY.

The location of these sheep was in the lower Similkameen Valley, close to the Washington State border. The flock consisted of 719 sheep of mixed breeding, chiefly grade Suffolk and Merino. The sexes were as follows: Rams 12, wethers 123, ewes 584; of the latter about 135 were yearlings, of which some 50 or 60 were not with lamb.

Winter feeding started on January 14 on a redtop hay which contained a small amount of ergot, a not uncommon occurrence in the interior of British Columbia. It is, however mentioned, as one veterinarian who saw these sheep diagnosed their complaint as ergot poisoning. On February 1 the feed was changed to alfalfa and was gradually increased until by the 25th they were being fed heavily. Lambing was due to start about March 1, and all sheep were in a fat condition.

Good water was always available, but a number of animals showed a preference for snow. Salt was regularly supplied, 14 pounds of sulphur being mixed with 100 pounds of salt. About lambing time some chopped oats and bran was fed. Shortly after the trouble started some turnips were offered, but were not readily eaten, apparently because the animals were not accustomed to roots. The animals being fasted, it was noticed that they ate a lot of cactus *(Opuntia sp.)* and it was thought that they had been eating some before.

On February 17th the owner wrote this laboratory to the effect that he had lost 9 fat ewes with lamb, and described symptoms which indicated a feeding trouble; advice was given to cut down the feed and to give lots of exercise. This letter was held up in the mail, but on March 6 he fasted them for four days; at that time 150 animals were down and others showed sickness. On the fourth day many passed feces, and on the two following

days many more were relieved from the constipation, which had been general. During this time it was noticed that the sheep were eating a lot of cacti; this no doubt helped, as it is known that some species of *Opuntia* are laxative; on the other hand, they may serve to form phytobezoars.

A telegram having been received to the effect that some 50 sheep had died, it was decided to investigate the trouble in person. This was done on the 13th of March, by which date further fatalities had occurred and a large number of other animals were in a precarious condition.

The feed had been cut down, but the sheep were still without sufficient exercise or laxative food, such as roots or linseed oil meal. No new cases had shown up for five days, nor were any seen by me. The day after I left some occurred; the owner then fasted the sheep for two days with good results. All ewes that looked like lambing were then put into a corral and fed lightly on alfalfa and turnips, which they would now eat freely. Latest reports are that these ewes have lots of milk and that no new cases have developed. The balance of the flock—wethers, ewes that had lost their lambs, and ewes that had their lambs—were fed on alfalfa in a pasture near the corral for seven days, when some of them appearing dumpish the owner quit feeding and took them to the hills; good results followed, due no doubt to the fact that they were at last getting the exercise necessary in having to find their own food.

All the ewes were affected and 92 died. All the wethers were affected, but only two were badly so, and none died. The 50 or 60 yearling ewes not with lamb were all affected to the same extent as the wethers, as were the rams.

SYMPTOMS.

The early symptoms, which unfortunately were not seen in person, are stated to be as follows: The animals appear dull, hang their heads and let the ears droop, are off their feed and constipated, froth a little at the mouth, but frothing does not last over one day; there is a nervous movement of the head and ears and the head may be carried high or to one side; there is apparent blindness, an unsteady gait and grinding of the teeth. The degree of sickness varies, some may keep on their feet, but the bad cases go to the ground in from one to four days; the fattest ewes go down the quickest. When they first go down there are slight nervous spasms, afterwards they lie for days

almost motionless. Animals that had received doses of salts or oil suffered severely for seven or eight days, grinding the teeth and having nervous spasms every little while. The majority lie in a comatose condition, but occasionally the feet may be moved a little; urine, which appeared normal is passed, and feces may be after the lapse of several days. Such feces are in a mass indicating the fixed position of the animal, and the masses show the first feces to be very hard, gradually becoming softer and mixed with sand, bile and sometimes blood. The presence of bile and sand is often well marked. The animals usually lie on one side with the head slightly drawn back, but in one instance a sheep was seen which laid for days in the normal attitude of sleep and eventually died in the same position. The shortest time an animal was sick is said to be ten days, and the longest time three weeks.

Many ewes give birth to premature lambs, usually only a few days off term, but in one instance the owner claimed birth was twenty days ahead of time. Even after being down five or six days, and in one case eleven days, living lambs were born; in fact, over 90% of such lambs are born alive. When parturition occurs, and if defecation has taken place, the ewe can often stand if helped to her feet, and will recover. It is interesting to note that the ewe which had a lamb after being down eleven days has made a complete recovery, notwithstanding the fact that no food or water was taken for that length of time, and probably for a day or two before. There is usually no elevation of temperature, but such may appear, as in some cases gangrene of the bowel occurs through continued pressure of fecal masses; the respiration is shallow and the pulse fast and weak. About 35 ewes were dry after recovery, and in all the milk was scanty or absent for one or two days. This was responsible for a heavy mortality in lambs (number undetermined), many being killed for lack of mothers. In some instances where recently recovered ewes had enough milk to suckle a lamb, the lamb would die, presumably either because it had become weakened in utero or that the milk contained some of the toxins absorbed from the intestinal tract. It may also be noted that lack of milk was noticeable in ewes which had not been down but which had been sick.

AUTOPSY.

In general lesions are confined to the abdominal cavity, there being intense constipation, a yellowish clay-colored liver and

fatty kidneys. The stomachs show no inflammation, but the rumen and omasum are full and contain some sand, the reticulum and abomasum may be empty or contain a little food. The small intestines are bile-stained. Hard fecal matter occurs all through the intestinal tract; in many instances oval masses some three to four inches long by one and a half to two inches in diameter are found; such masses may consist largely of sand and gravel. In cases where these have exerted continual pressure, gangrene of the bowel occurs, with a resulting peritonitis and invasion of the body by organisms from the intestinal tract.

The presence of sand was no doubt largely due to the sheep picking up the same when eating cacti. No evidence of perforation by the spines of cacti was noticed, neither were the oval masses cactus phytobezoars.

The spleen, heart and lungs appear normal, but the latter naturally show some congestions, due to the long time the animal has been on the ground. The kidneys are fatty, and the liver varies in color, but is usually a yellowish clay color, the gall bladder is full of a light-colored bile. The urine looks normal, but unfortunately none was collected for laboratory examination. *Cysticercus tenuicollis* was not an uncommon parasite. Microscopical examination of the heart, liver and kidney of animals which had been down for a number of days, show that there may be a slight degeneration of the heart muscle, necrosis and fatty infiltration of the liver, fatty infiltration of the kidney and a diffuse glomerular and tubular nephritis.

TREATMENT.

If given early enough a dose of salts or oil and enemas are of benefit, but experience shows that badly affected animals suffer acutely if drenched and usually die.

Should any ewes show signs of parturition they should be delivered at once, and providing defecation has occurred (as sometimes happens under the influence of bile secretion), they may then be helped to their feet, and carefully tended, when recovery will often result, even though the animal has been lying in a comatose state for days.

All sick animals that are able to walk should be made to take exercise, and should have their feed cut down sharply; actual starvation for two or three days will be beneficial if symptoms are aggravated. If possible, some succulent food, such as roots, should be fed, or small quantities of bran mash or

linseed oil meal. A liberal supply of salt should be provided, to which some charcoal may be added with advantage.

COMMENT.

While there may be other closely allied conditions in sheep, it seems reasonable to suppose that at least some of the cases which have been diagnosed heretofore as preparturient eclampsia and prepartum paralysis are in reality cases of stercoremia.

While such a condition exists in males and non-pregnant females, it is undoubtedly worse in pregnant ewes; this is probably due to the increased tendency to constipation through presure caused by the uterus, and to the fatty condition of the liver commonly seen in pregnant animals. One of the most important functions of the liver is that it is a neutralizer of poisonous proteid products formed in the intestine; given an increased tendency to constipation and a liver that is already somewhat altered, one can readily understand why the pregnant animal suffers the most. The gravid uterus undoubtedly plays some part, probably in providing that much more space for the accumulation of toxins, as once parturition occurs relief is afforded.

In this question of auto-intoxication, it must be remarked that all the tissues of the body are mutually interdependent. If one suffers, all suffer, and a disease of one organ or tissue is thereby apt to establish a vicious circle which is constantly enlarging.

REFERENCES.

Allbut, Sir T. C. (1910.) Medicine. *Ency. Brit.*, 11th ed., Vol. 18, p. 63.

Frey, F. F. (1918.) Antepartum paralysis in sheep. *Am. Jour. Vet. Med.*, Vol. 13, No. 6, p. 283.

Glover, G. H., Newsom, I. E., Alkire, E. W. (1919.) Investigations to determine cause of sheep diseases in Colorado. *Jour. Am. Vet. Med. Assn.*, N. S. Vol. 8, No. 1, p. 18.

Hadley, F. B. (1918.) Preparturient eclampsia of ewes. *Am. Jour. Vet. Med.*, Vol. 13, No. 6, p. 284.

Luckey, D. F. (1918.) Good care kills sheep. *Am. Jour. Vet. Med.*, Vol. 13, No. 5, p. 248.

Mott, F. W. (1910.) Neuropathology. *Ency. Brit.*, 11th ed., Vol. 19, p. 430.

Newsom, I. E. (1918.) Antepartum paralysis in sheep. *Am. Jour. Vet. Med.*, Vol. 13, No. 7, p. 353.

Smith, F. (1902.) *A Manual of Veterinary Physiology*, p. 204.

Stengel, A. (1914.) Constipation; in Osler and McCrae's *Modern Medicine*, 2nd ed., Vol. 3, p. 315.

Stockton, C. G. (1914.) "The interrelation of digestive functions," in Osler and McCrae's *Modern Medicine*, 2nd ed., Vol. 3, p. 19.

Tuke, Sir J. B. Macpherson, J., Bruce, L. C. (1910.) Insanity. *Ency. Brit.*, Vol. 14, p. 599.

CASE REPORTS.

JAMES A. WAUGH, Pittsburgh, Pa.

Delayed Bovine Delivery — Water bag broke at 7 A. M.; owner delayed and did not call me until 5 P. M., after he had examined and "found the tail coming;" hind legs flexed at the hocks, and caught on the brim of the pelvis. I corrected the posititon and delivered a live heifer calf.

Had three cases last year: Two dead bull calves, and the owner raised the heifer calf. Examined and found another tail and hind limbs; then delivered a fine bull calf alive.

Fleming-Craig and Williams describe these conditions, but they are rare. Used only my hands and small ropes in delivery, but was well equipped with instruments. Dr. Rectenwald had converted and presented me with a "Farmer Miles" leg extender or spreader made into an obstetrical repeller, and I was tempted to use it, as the owner was out in the pasture after the cows and I feared it might be a thoroughbred calf, which I was anxious to deliver alive if possible in the absence of the owner —"Wanted to win!"

Silicate of Soda in Broken Limbs—I have had good success with silicate of soda solution in bandages applied to broken limbs.

A race horse (a pacer) broke an *os-corona* in a front limb in a race at Washington Fair last September. The animal is now in training and going sound.

Another, a large 5-year-old draft gelding, broke an *os-corona* in front leg in a runaway. This horse is now working on the farm, although his joint is stiff below the fetlock.

I have had dozens of cases in dogs, the last one being a broken tibia in a 7-year-old fat dog, which ended in recovery.

THE JOURNAL begs to acknowledge the courtesy of the Bureau of Agriculture of the Philippines for permission to use the following illustrations; of Mr. O. W. Barrett, of New York City, for obtaining the same; and of Dr. R. W. Shufeldt, of Washington City, for his kindness in sending them for publication; and while hermaphrodism and false hermaphrodism may not be unfamiliar to readers of THE JOURNAL in this country, it is believed that the illustrations shown, including the surra case. which was a monorchid, may prove of interest to many.

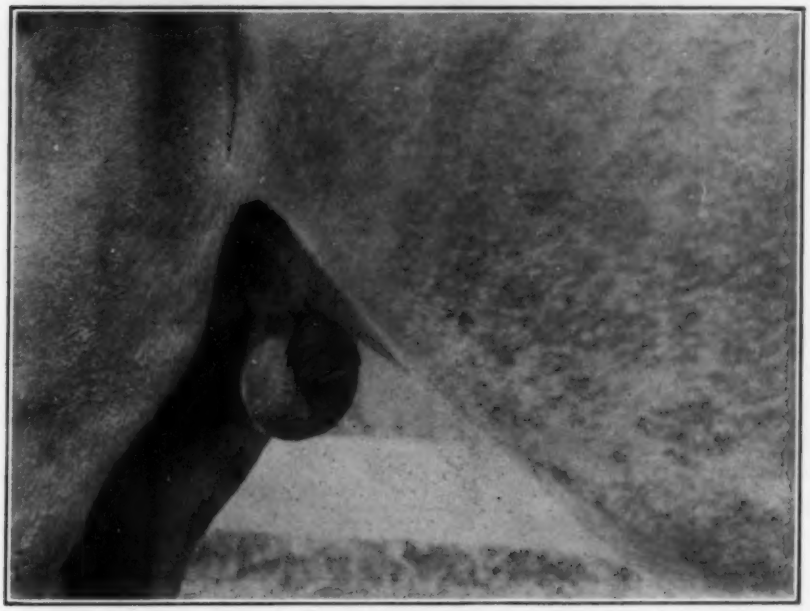


FIG. 1.

Surra case of long standing on Alabang Stock Farm. Scrotal and Preputial Edema. Monorchid: One testicle possibly removed, possibly abdominal. Not destroyed by edema because the one in evidence is apparently normal as to size and location. Preputial Edema dripping serum from lower surface of scrotum.

FIG. 2.

False Hermaphrodism in Native Horse—Mestizo (grade); sire and dam Mestizos. Only glans of penis normal; body of penis retrovergent; very short. Testicles probably inside of abdomen.

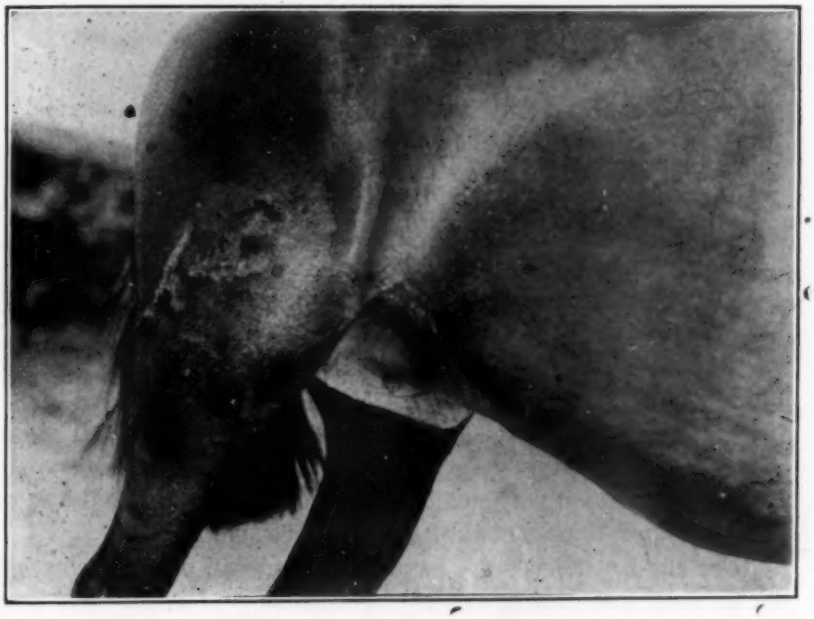


FIG. 3.

Same animal as shown in Fig. 2. Note the female side as shown by the teats.

ANOTHER VETERINARY SCHOOL.

The State College of Agriculture of Georgia for the first time announces a Veterinary Degree Course of four collegiate years leading to the degree of D. V. M.; also a combined course in Agriculture and Veterinary Medicine to occupy six years, the degree of Bachelor of Science in Agriculture to be conferred at the end of the fourth year; the degree of Doctor of Veterinary Medicine to be conferred at the completion of the entire course.

In announcing the course, the Bulletin of the College states: "The General Assembly of the State of Georgia, realizing the importance of the development of the live stock industries and the necessity for guaranteeing protection against the ravages of diseases which commonly decimate herds and flocks in localities not provided with efficient veterinary service, and wishing to provide means by which the services of graduate veterinarians may be guaranteed to the State and nation, has appropriated funds to the State College of Agriculture for the maintenance of a veterinary degree course."

This adds another school to the few veterinary institutions already established in the South.

ABSTRACTS.

ANÆSTHESIA IN ANIMALS.

BIBBEY (H.)
The Veterinary Record (London), June 7, 1919, p. 460.

From the correspondence in our daily papers and our Veterinary Journals it will be seen that there is a likelihood of an Act of Parliament compelling all operations on animals to be done under some anæsthetic.

If I might say a few words in favour of this Bill, I think as far as it goes it is a very good Bill, and in my opinion will help the profession very much; but I do think there should be no specified operations, but that all should be included.

For the last 20 years I have never done an operation except under some anæsthesia, and the operations performed have been many and various. I never had any cause for alarm or complaint, and I might say that if once a man operated under an anæsthetic he would never resort to the old method. There is the absence of increased help, and there is the comfort in controlling your patient to your requirements.

Now take the simple operation of docking. The colt or other older animal is caught, and the seat of operation put under local anæsthesia, and in a few seconds the tail can be amputated with the scalpel, and the arteries secured. There is never any evidence of pain, and the colt will stand in the same position after he is liberated. I have docked some thousands of colts of all ages, and never had to put one under restraint, beyond one man. I do all severe operations under chloroform, including parturition in ewes, and prolonged parturition in the mare.

Some weeks ago I was asked by a gentleman who is a member of the R. S. P. C. A. to castrate some colts, but I must put them under chloroform. The fee was fixed and the arrangements made. The first colt was brought out and cast on his side, and chloroform was administered; after some excitement the colt was under, and the operation performed to the owner's wish, but he thought the colt suffered a little when coming round. This I explained was the effects of chloroform and not under my control.

I then advised him to allow me to castrate the next colt under cocaine; this he consented to. The colt was cast on its side, same as the other one (which I may say is very simple and quick). After the usual antiseptic toilet the testicle was placed under cocaine, using a very long and fine needle (which is the secret of success). If the needle is plunged well into the testicle, which is very soft, the colt feels very little. After a time it comes under the anæsthetic, the scrotum is opened, the testicle is liberated, all the non-vascular parts separated, and with the castrator the operation is finished. Allow the colt to get up without any feeling of pain whatever; he walks off as if nothing had happened.

I asked the owner after if he wanted me to chloroform the third colt, but the cocaine had so pleased him, that I had to do the other the same.

At the time of writing this letter I have just operated upon a cow's teat for stricture of the duct, by opening the sinus halfway up under cocaine, without the animal being held at all. The teat was laid open and restitched, and the cow was chewing the cud while I had the teat at my leisure.

No doubt there are others using it for their work, but if my experiences of the use of anæsthetics is a means of helping others in the cause of humanity I am satisfied.

LECLAINCHE AND VALLEE'S POLYVALENT SERUM FOR THE LOCAL TREATMENT OF WOUNDS.

[Translations and abstracts by William N. Berg, Washington, D. C.]

On the specific treatment of wounds. Leclainche and Vallée: Compt. Rend. Acad. Sciences; Vol. 154, pp. 636-637, 1912.

(Translated verbatim.)

With rare exceptions almost, specific serotheraphy has been limited up to the present time to the treatment of infections or of generalized intoxications.

We have attempted to utilize the properties of a specific serum in the treatment of wounds. It seemed to us that such a medication should realize the desiderata of modern surgery in permitting the discontinuation of antiseptics, not only for aseptic wounds, but also for certain infected wounds.

The serum should at one time cover the surfaces with a protective layer favorable to the vitality of the cells and bring to

the phagocytes the antibodies which stimulate their phagocytic action.

Such a serum should be polyvalent and capable of assuring the destruction of germs habitually found in infected wounds. To obtain it we have submitted the horse to an immunizing treatment with the following varieties of microbes: staphylococci and streptococci of different varieties; colon bacilli and pyocyaneus of various strains. The serum should be rich in agglutinins, lysins, and amboceptors (sensibilisatrices); our animals were immunized subcutaneously and by repeated inoculations.

The bacterial bodies used were obtained from agar cultures or on the Maurice Nicolle medium (potato agar; gelose a la pomme de terre). Equal parts of the organisms are used in the mixture. The bacteria, killed by alcohol-ether, are then dried and preserved in vacuum in a refrigerator. For use, the dried germs are weighed, ground in an agate mortar, and emulsified with physiological salt solution. One injects from 0.005 to 0.050 gram of dried microbial bodies, corresponding to ten times the weight of the fresh microbes. The inoculations are made every 8 days, with increasing doses. After several months of treatment the subjects support the injection of 0.050 gram of fresh microbes, with nothing but vigorous local reactions and rises in temperature.

The serum obtained is very rich in agglutinins and amboceptors. The complement deviation test shows that these latter can fix quantities of fresh guinea pig complement frequently greater than 1 c.c., using either the microbial mixture used in treatment or any one of the germs composing it.

The amboceptors (sensibilisatrices), which represent the ferment essential to the intra-leucocytic digestion of the organism, act as they were a rigorously specific antiseptic, and they are brought in a vehicle undoubtedly favorable to cellular life and certainly incapable of harm.

We have used the serum for the treatment of the most divers accidents: wounds that are old or extensively relaxed (atones) and suppurating cavities. After washing with boiled water, an application is made of the liquid serum or of the dried, powdered serum.

The details of the observations need not be given here. In all cases the duration of cicatrization is noticeably shortened and it takes place very often with a surprising rapidity.

Comparative treatments with normal horse serum demonstrate the role of the specific bodies in the polyvalent serum. As might be expected, the medication is fully efficacious only if the wounds treated contain, as agents active in tissue disintegration, the species used in treating the producers of the serum. Thus only mediocre results are obtained in treating suppurating cavities caused by inoculation with (bacille pesteux) bac. of bubonic plague (observations of Prevot and Ramon).

With these reservations in mind, surgical therapy should benefit largely by the use of a serum obtained under the above described conditions.

On the Specific Serum Treatment of Wounds. Leclainche and Vallée: Revue Générale de Médecine Vétérinaire: Vol. 24, pp. 313-316, 1915. Translated verbatim.

The medication of infected wounds consists essentially in the destruction of germs which prevent or retard cicatrization. This destruction may be realized by the use of antiseptics or by the intervention of the organic defenses.

The inconvenience of antiseptics lies in the fact that they exert their destructive action on living elements at the same time, altering or killing the organic cell at the same time with the microbes introduced. On the other hand, the organic defenses, left to themselves, operate but slowly in the tissue repair; if this is insufficient, the local accident's progress or the infection becomes general through blood or lymph channels.

In the absence of an antiseptic selective to the microbial cell, which has not yet been obtained, the physiological treatment of infected wounds seems to be attainable only by provoking an exacerbation of the organic defense. To be efficient, this action should determine not alone the phagocytic absorption of the microbial agents, but also and always their intracellular digestion.

It is possible to provoke phagocytic absorption in various ways; certain physical agents and the application of normal horse serum act in this way. However, this ingestion of germs does not by any means imply their destruction; the parasitized cells are killed in large numbers and undergo purulent disintegration.

Experimental studies carried out during the past few years enable us to state that it is possible to assure the digestion of the

microbial agents in the wound by bringing to the organic cells, in a specific serum, the amboceptors (sensibilisatrices) corresponding; to conserve to the cells all their vitality and their aptitude for building repair tissue.

In March, 1912, we made known, in a communication to the Academy of Sciences, a method of obtaining a polyvalent serum which up to the present has been prepared in the laboratory and with aim toward scientific research. This serum has been experimented with in several service hospitals during the past years. Actual conditions have permitted numerous trials. It contains the antibodies corresponding to the diverse agents of inflammation and suppuration; numerous strains or varieties of staphylococci, streptococci, colon bacilli, pyocyaneus, proteus, etc. With these ærobes we have associated various anærobes: vibrion septique (malignant edema) and perfringens bacillus (also called Bac. phlegmonis emphysematosæ by Fraenkel; Bac. ærogenes capsulatus by Welch and Nuttall; the gas bacillus; bacillus of gas-gangrene).

The action of the polyvalent serum is exercised locally on all wounds of whatever origin, suppurating or not; it acts in the same fashion on mucous and serous membranes.

Not alone is its application painless, but the preëxisting pain diminishes and disappears almost entirely. In a number of cases, the pus has disappeared in 48 to 96 hours; in more grave cases, the characters of the suppuration have changed; pus that was fetid, sanious, colored, gave way to a light discharge which rapidly disappeared itself.

At the same time the wound cleans itself, the coatings disappear, the sphaceli (gangrened parts) are eliminated, non-detached flaps become repaired.

The disappearance of the suppuration and its modifications of appearance are constant; they characterize the action of specific polyvalent serum.

The transformation of the local condition is followed by a disappearance of secondary phenomena; edema, lymphangitis, local or diffuse; adenitis.

The temperature in cases of fever is lowered after the first dressings; in other cases, the application of the serum causes a thermal reaction, slight and temporary. The general condition of the patients improves and they experience a sensation of well-being. Cicatrization is rapid, a considerable gain is made over

the usual period, and the appearance of the cicatrices is irreproachable.

The mode of action of the polyvalent serum implied direct contact with the tissues.

This action is altogether different from that of normal horse or goat serum experimented with by various workers after the interesting researches of Raymond and Petit.

The specificity is demonstrated by an entire series of experiments. Its reactions in vitro are specific. It acts remarkably in the treatment of wounds of the horse, although it is naturally indifferent to the normal homologous serum; further, its action is limited to the horse infected with the species used in the preparation of the serum. This specificity is established clinically; fall in temperature, disappearance of pus, rapidity of action, after controls with other medicaments and especially with normal horse serum, fresh or heated.

The mode of action of the polyvalent serum implies the necessity of direct contact with the tissues injured, hence the necessity of various methods; surface dressings, soaked pads, injections into cavities or passages.

The medication should be completed by measures appropriate to the length of time the foreign body has been in the wound or sequestra in the tissues.

The role of the serum permits its use without the use of any antiseptic. By its coagulating and negative chemotactic action the antiseptic cannot help paralyzing or interfering with phagocytic action and that of the antibodies. A simple washing with water or physiological salt solution constitutes the sole preparation desirable.

The applications today are used for a most diverse variety of accidents; with regard to their form and location, but comprising in every case a microbial infection, various trauma, war wounds, anthrax, connective tissue inflammation (phlegmons), abscesses, suppurating arthritis and synovitis, infections of the eye, suppurating cutaneous affections, burns and chilblains, etc. In all cases very valuable and neat results have been obtained without the slightest serum sickness or anaphylaxis having been observed.

The polyvalent serum is also indicated in preventing complications in the simple wounds and trauma of operations. The serum dressing realizes a true physiological antisepsis the ad-

vantages of which are easy to foresee. It is indicated in all surgical interventions, especially where a sufficient asepsis is not realizable or complications are to be feared, by reason of the condition or location of the wound (emergency operations, natural predispositions (diathesiques), grafts, peritoneal and other serous infections, local gangrene, etc.).

In a detailed memoir we will communicate the observations that have been communicated to us. We here salute the memory of MM. Motais and Reymond and thank MM. Bazy, Delbet, Legueu, Monprofit, Variot, Cazin, Soulie, Gagey, Soubrel et al., who have been kind enough to experiment with the polyvalent serum and to coöperate with us. For this we are profoundly grateful. (1)

The use of polyvalent serum in veterinary medicine; L. Cuvillier; Revue Générale de Médicine Vétérinaire: Vol. 24, pp. 392-402, 1915.

p. 393. Bacteriological investigations made on pus from various sources showed that in the majority of cases the presence of varieties of staphylococci, rarely streptococcic forms were present.

Cuvillier used the serum for 2 years in various service hospitals in Paris, always with good results. Clinical details of 7 cases are given, some of which had been treated only with the serum, others had had antiseptics.

The Specific Serum Treatment of Wounds; Leclainche and Vallée; Rev. Gén. de Méd. Vét., Vol. 25, pp. 306-316, 1916.

pp. 306-8. General discussion of the shortcomings of antisepsis.

p. 308. Beginning with 1907, our investigations of the specific treatment of wounds led us in 1910 to obtain a serum active toward the most usual pyogenic agents and we have made a comparative study of its action and that of normal serum of the same origin.

As large a variety of microbes as possible is obtained from infected (p. 309) wounds of all kinds and different localities. Each type is cultivated separately. The totality of germs obtained, after drying in vacuum after the action of alcohol and

(1) The specific polyvalent serum is prepared at the laboratory of Professor Vallée at the Veterinary School at Alfort; at present the entire production is reserved for the exclusive use of the Health Service.

ether, are to be used, under rigorous conditions, for the progressive immunization of the horses to produce the serum. When a test shows the presence of a sufficiently high content of lytic and bacteriotropic antibodies, the animal is bled aseptically. The serum which they furnish is, in general, strictly sterile. However, on account of the accidental contamination by organisms from the air or wandering in the circulation, the liquid after transference to ampoules is submitted to tyndallization (intermittent sterilization) by repeated heating at 56-57. Kept at 38 for 4 days, the ampoules, before delivery, are individually controlled. Naturally, no antiseptic or other product is added to the serum; it remains entirely physiological.

p. 309. The antibodies may be detected by the ordinary laboratory methods (agglutination, complement deviation, measure of bacteriolytic power). It is only a matter of using the current methods and experiments that are always verifiable.

Observations demonstrate that an action that is local is exercised on the infected wound. This is shown especially by a clinical study of the comparative evolution of wounds treated with normal and with specific serum. This research on the horse permits most interesting observations. While normal horse serum is without action, as might be expected, the specific serum obtained from the same horse exercises a very evident action.

p. 310. In an infected wound the abundant suppuration of which has been dried up by one or two applications of specific serum, dressings with normal serum are followed by a return of the suppuration. It is, therefore, to its content of antibodies, and not to its physiological properties alone, that the specific serum owes its action. * * * the serum operates only against those varieties used in its preparation. (i. e., varieties of organisms.)

Over 300,000 ampoules of 5 c.c. of polyvalent serum have been delivered under our supervision.

The microscopic control of the exudates from treated traumata establishes the intensity of the phagocytosis stimulated by a favorable serum dressing. This is exercised especially on streptococci, staphylococci and pyocyaneus; one may even follow, using appropriate staining methods, the stages in the intracellular digestion of the phagocytized germs. However energetic this process may be, it never ends by a complete sterilization of the injured surfaces, and a culture from the local secretions

always shows them (p. 311) fertile. Aside from unforeseen conditions, a total cleansing can be accomplished only if the serum touch the fixed or migratory anatomical elements of the wound, and is renewed with sufficient frequency at their surface; necessities which are practically irrealizable.

* * * The local amelioration follows when it should, after the first dressings; but a complete action is not obtained until the medication is used regularly. Many failures called to our attention are due to the practice, so strongly contra-indicated, of using antiseptic washes before the serum dressing. * * *

p. 312. We have had in view only the production of a medication for wounds, the action of which is purely local.

Gradually, however, the serum from old producers acquired very manifest antitoxic properties. Accustomed to the hypodermic use of various serums, the medical corps naturally tried the polyvalent serum by this method, in the treatment of the infectious phenomena which accompany large traumata.

In this way it happened without any intervention on our part that several authorities in the surgical world have had recourse, in the treatment of large infected wounds, to intravenous or hypodermic injections of our serum. Because of the large number of favorable results obtained, we have set aside for this special use the serums from our oldest and most solidly immunized producers, making known to those interested that it would not be desirable to use hypodermically all of the polyvalent serum prepared by us. At this time, we have delivered two varieties of the same serum—one, fit for hypodermic use by reason of its great activity, the other, sufficient for dressings, reserved for this sole use.

p. 313. The fear of anaphylactic accidents should be no obstacle to the use of the polyvalent serum. * * * The local treatment of wounds with serum results in a slow penetration, which causes, according to Besredka, a progressive de-anaphylaxis, which, of itself, is sufficient to avert all serious accidents.

The contra-indication of the serum in cerebral surgery is a simple reminder of the classical lesson which must be formulated before the serum is placed in the hands of the physicians. The experiments of Besredka have shown that the brain reacts with extreme violence on the introduction of a small amount of serum in anaphylactic cases. All wounded should be considered as sensitized, at the time, by one or more injections of serum. It is

necessary to warn practitioners not aware of these facts against the temptation to apply locally on the centers a physiological liquid for the purpose of avoiding the dreaded effects of antiseptics. * * *

A too prolonged use of serum tends, at most, to the appearance of serum erythema or pseudo-erysipelatous lesions, always localized about the wound. The absolute innocuity of long repeated dressings in the cure of radiodermatitis systematically followed with great success in the various services of the Saint Louis Hospital is a convincing proof of the sound foundations of our assertions.

p. 314. We would terminate this exposition with the question whether the use of an anti-gangrene serum might not be confused with that of the polyvalent serum; it is convenient to briefly recall the conditions.

Until lately, it was admitted as a classic notion that the gaseous gangrene of the surgeon, the malignant edema of Koch, the traumatic gangrene of the veterinary surgeon are due to the septic vibrio of Pasteur. Since, during the past 20 years, gaseous gangrenes of non-vibrio etiology have been found in widely separated instances, there is a tendency to consider these accidents as relatively exceptional.

In 1898 one of us showed that one obtains with animals immunized and treated with the virulent septic serous fluid from the vibrio, a serum endowed with absolute preventive properties with regard to experimental infections of susceptible species. The serum is, at the same time, antimicrobic and antitoxic; it neutralizes in vitro the septic toxin which in several instances kills the experimental animals when injected intravenously.

The well-known frequent complications of gaseous gangrene in war wounds constituted an indication for the use of a preventive serum, and in the last months of 1914, first at Bordeaux and then at Paris, several horses were immunized for the use of the Sanitary Service of the Army.

Various circumstances prevented the delivery of the serum and the delay enabled us to submit the producers of the serum to a treatment with B. perfringens, regarded as a frequent cause of gaseous gangrene.

On the other hand, the hypodermic use of a part of the polyvalent serum enables one to obtain a unique type by a combined treatment of the same producer with pyogenic and septic

agents; vibrio and perfringens. The totally different methods of immunization permit this dual object and experimental tests demonstrate that the superposition of the actions does not diminish either of them. (Note by Berg: The N. Y. City Board of Health have immunized one out of eleven horses to both tetanus and diphtheria at the same time, producing a serum with a high potency for both.)

It is therefore easy to prevent gaseous gangrene due to septique and perfringens (i. e., vibrio septique and B. perfringens).

p. 315. It is indispensable that the pathogenic microbes be phagocyted. For a long time we have been studying the conditions of phagocytosis of a microbe closely alled to V. septique, the bacterium of symptomatic anthrax, which certain bacteriologists have identified with the vibrio of Pasteur.

We have showed that for the bacillus of anthrax the phagocytic action is experimentally retarded by local traumata, notably the hemorrhages, by the association of the virus with inert particles, by the presence of foreign bodies and by the simultaneous presence of other microbes deprived of all pathogenic action.

The serum may, therefore, sometimes fail in the cases of V. septique and B. perfringens. On the other hand, the experimental prevention is so clearcut that its systematic use for the wounded seems indicated.

For preventive measures, the treatment has no inconveniences and is similar to the preventive treatment of tetanus. The passive immunity lasts for a few days only; hence it should be renewed as with tetanus serum until the cleaning of the infected wound is realized.

As a curative measure, the serotherapy is indicated in the beginning of infections as a complement to the various surgical and therapeutic measures.

The therapeutic action of the serotherapy is specific, and the limit of its efficiency is marked by the proportion—indeterminate at the actual hour—of the gangrenes due to V. septique and B. perfringens. But in such cases failure is to be expected, theoretically.

The systematic prevention of gaseous gangrene will be realized perhaps when one has determined the various etiological factors and the corresponding antibodies have been obtained.

The Polyvalent Serum in Veterinary Therapy: Leclainche and Vallée; Rev. Gén. Méd. Vét., Vol. 26, pp. 65-67, 1917.

A brief re-statement of the precautions necessary in the use of polyvalent serum and its limitations.

The Treatment of Wounds with the Polyvalent Serum of Leclainche and Vallée: Rev. Gén. Méd. Vét., Vol. 26, pp. 67-79, 1917, Guillaume and Bittner.

Grave cases which cannot be treated satisfactorily by antiseptics will yield to polyvalent serum. Clinical details are given of about 12 cases, which demonstrate, according to G and B, the superiority of the serum treatment over that with antiseptics.

Specific Serotherapy of Wounds and Pyogenic Infections. A. Guillaume and G. Bittner; Revue Générale de Médecine Vétérinaire; Vol. 28, pp. 113-136, 1919.

A continuation of these authors' previous work on the use of the polyvalent serum of Leclainche and Vallée in the local treatment of wounds. A number of important observations demonstrate rigorously the remarkable fidelity of the method and the rapid successes it has given in certain desperate cases.

The new series of observations include wounds of all kinds, in all regions and of all tissues, as well as several cases of generalized pyogenic infections. Twenty-nine cases are described, giving treatment, etc., with the polyvalent serum, as follows: fistulous withers; wounds of ligaments and tendons; wounds of joints, suppurating arthritis of the shoulder; street nail; cartilaginous quittor; "classic" ulcerous lymphangitis of Preisz-Nocard; infectious polyarthritis of colts, etc.

Among their conclusions the authors state that in the treatment of wounds nothing can compare with the serum treatment.

Dr. J. M. Smith, Baton Rouge, La., has been transferred by the Bureau to Birmingham, Ala.

Captain D. J. Meador has returned to Auburn, Ala., after being stationed at Camp Kearny, Calif., since January.

Dr. James A. Waugh, of Pittsburgh, Pa., has been offered and has accepted the chair of Surgery and Obstetrics in the Cincinnati Veterinary College.

ARMY VETERINARY SERVICE

FROM THE OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

The following orders of transfer and reassignment have been issued for Veterinary officers during the past month:

1. Major J. R. Jeffers, V. C., U. S. A., from temporary duty in the office of the Surgeon-General to Fort Keogh, Mont., for duty as the Veterinarian.

2. Major Frank G. Hershberger, U. S. A. ,relieved from present duties and directed to report at Camp Upton, N. Y., for duty as the Camp Veterinarian.

3. Major Geo. A. Hanvey, Jr., U. S. A., from duty at Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

4. Major Andrew E. Donovan, U. S. A., from duty at Camp Dodge, Iowa, to Camp Grant, Ill., for duty as the Veterinarian.

5. Major Chas. H. Jewel, U. S. A., from duty at Camp Dix, N. J., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

1. Captain J. L. Hartman, V. C., from duty at Chicago, Ill., to Manila, P. I., for duty in the Philippine Department.

2. Captain S. B. Ingram, V. C., from duty at Chicago, Ill., to Manila, P. I., for duty in the Philippine Department.

3. Captain Clarence Loveberry, V. C., is relieved from duty in the Philippine Department upon arrival of Captain Ingram and directed to report to San Francisco, Calif., and to the Adjutant General for instructions.

4. Captain J. R. Steffler, V. C., from Camp Dix, N. J., to Fort Oglethorpe, Ga., for duty as Post Veterinarian.

5. Captain H. Clarke, V. C., from Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

6. Captain J. F. Crosby, V. C., from Camp Grant, Ill., to West Point, Ky., for duty as Camp Veterinarian.

7. Captain E. P. O'Connell, V. C., from Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

8. Captain J. A. Weigen, V. C., from duty at Camp Dix, N. J., to A. R. D. No. 329, Camp Travis, Texas, for duty at that place.

9. Captain R. R. McComb, V. C., from Camp Devens, Mass., to Chicago, Ill., for a course in instruction in meat inspection.

10. Captain R. V. Vanskike, V. C., from A. R. D. Camp Sheridan, Ala., to Fort Oglethorpe, Ga., for duty as the Veterinarian.

11. Captain N. Neat, V. C., from Camp Lee., Va., to Chicago, Ill., for a course in instruction in meat inspection.

1. 1st Lieut. F. C. Waters, V. C., from Fort Oglethorpe, Ga., to A. R. D. No. 329, Camp Travis, Texas, for duty.

2. 1st Lieut. H. L. Williams, V. C., from Remount Depot, Fort Reno, Okla., to Camp Sherman, Ohio, for duty.

3. 1st Lieut, J. A. Rennie, V. C., from A. R. D. No. 328, Camp Bowie, Fort Worth, Texas, to Camp Courchesne, N. M., for duty with the 9th Engineers.

4. 1st Lieut. H. M. Savage, V. C., from Hoboken, N. J., to A. R. D. No. 304, Camp Meade, Md., for duty.

5. 1st Lieut. F. W. Lambert, V. C., from Camp Dix, N. J., to Camp Eagle Pass, Texas, for duty.

6. 1st Lieut. M. Sierveldt, Jr., V. C., from Chicago, Ill., to Camp Eustis, Lee Hall, Va., for duty as the Veterinarian.

7. 1st Lieut. F. B. Steinkolk, V. C., from Camp Dix, N. J., to Fort Sill, Okla., for duty as assistant to the Post Veterinarian.

8. 1st Lieut. C. J. Lambert, V. C., from Camp Dix, N. J., to Fort Huachuca, Ariz., for duty as assistant to the Post Veterinarian.

9. 1st Lieut. O. W. Howells, V. C., from his present duties at Fort D. A. Russell, Wyo., to duty as assistant to the Veterinarian at that place.

10. 1st Lieut. L. A. Marshall, V. C., from Camp Dix, N. J., to Camp Grant, Ill., for duty with the 6th Division.

11. 1st Lieut. F. W. Taylor, V. C., from Camp Dix, N. J., to El Paso, Texas, for duty with the 8th Engineers, Camp Baker.

12. 1st Lieut. F. H. Woodruff, V. C., from duty with the 8th Engineers, Camp Baker, Texas, to San Francisco, Calif., for transportation to Philippines for duty in the Philippine Department.

1. 2nd Lieut. H. W. Wise, V. C., from Chicago, Ill., to Port of embarkation, Hoboken, N. J., for duty.

2. 2nd Lieut. L. T. Eagle, V. C., from duty at Newport News, Va., to Charleston, S. C., for duty at the Port of Embarkation at that place.

3. 2nd Lieut. J. B. McNamara, V. C., from Camp Dix, N. J., to A. R. D. No. 323, Camp Funston, Kans., for duty.

4. 2nd Lieut. T. J. Riley, V. C., from Camp Dix, N. J., to A. R. D. No. 305, Camp Lee, Va., for duty.

5. 2nd Lieut. H. Leberson, V. C., from duty at Camp Jackson, S. C., to A. R. D. No. 329, Camp Travis, Texas, for duty.

6. 2nd Lieut. C. F. Wilson, V. C., from Camp Grant, Ill., to A. R. D. No. 322, Camp Dodge, Iowa, for duty.

The following officers have been honorably discharged from the Veterinary Corps, United States Army, during the past month:

LIEUTENANT-COLONELS.

1. H. E. Bemis
2. Reuben Hilty

MAJORS.

1. W. F. Guard
2. Walter G. White
3. John R. Scully
4. H. B. F. Jervis
5. Christian Wm. Greenlee

CAPTAINS.

1. H. L. Messmore
2. C. W. Likely
3. R. S. Sugg
4. W. C. Nickel
5. E. C. Jones
6. M. S. Esslinger
7. J. S. Spikes
8. F. M. Lee
9. J. L. Lindsay
10. Ora L. Campbell
11. L. R. Smith
12. Daniel J. Meador

FIRST LIEUTENANTS.

1. A. H. Schmidt
2. J. G. Bailey
3. Bernard Johnsen
4. H. J. Weaver
5. F. M. Hopper
6. W. A. Litton
7. R. Fenstermacher
8. E. L. Hannon
9. D. R. Duff
10. R. A. Branson
11. M. L. Nelson
12. J. L. Klotz
13. S. L. Pilgrim
14. E. B. Mount
15. J. L. Skiles
16. G. C. Armstrong
17. H. C. Wachs
18. A. X. Barr
19. W. G. Ellwitz
20. C. B. Shore
21. F. E. Hill
22. G. E. McEvers
23. J. O. Schlegel
24. C. J. Couchois
25. A. A. Leibold
26. E. O. Ericson
27. J. N. Campbell
28. S. W. Harrison
29. J. L. Hartranft
30. C. A. Collins
31. L. D. Potter
32. MacF. Campbell
33. E. A. Dowd
34. E. W. Youngblood

FIRST LIEUTENANTS—*Continued.*

35. G. W. King
36. M. E. Agnew
37. Odell Archer
38. Clive Daly
39. H. F. Nimphius
40. R. H. Schneider
41. G. W. Hunter
42. David M. Smith
43. J. H. Hewitt
44. H. C. Kutz
45. C. A. Beall
46. Nelson N. Lefler
47. Anthony V. Jandernoa
48. Redfield C. Mills
49. Alfred T. Baesxler
50. Wm. M. Thomson
51. Elmer Wm. Berg

SECOND LIEUTENANTS.

1. W. H. Hauer
2. H. B. Mitchell
3. C. P. Lunneen
4. G. L. Allen
5. H. P. Bonnikson
6. E. S. Ring
7. E. E. Lange
8. D. W. Nicholas
9. S. P. Bolstad
10. Wm. W. Yard
11. F. Low
12. R. W. Cates
13. P. F. Carr
14. C. M. Dee
15. E. A. Gilmore
16. H. W. Ayers
17. L. W. Ingram
18. J. N. Hunter
19. J. E. Gilfillan
20. W. R. Peeler
21. H. E. McLaren
22. H. J. Gohde
23. Max Danziger
24. P. B. Silvester
25. F. H. Schroer
26. D. W. Kennamer
27. S. M. Turner
28. H. G. Weigand
29. J. R. Kreger
30. W. C. Schultz
31. Loren Flora
32. R. A. Showalter
33. F. A. Burlington
34. R. C. Gilmore
35. D. B. Wilson
36. F. E. Kitchen
37. S. B. Watson
38. H. R. Hornbaker
39. H. K. McIntosh
40. F. C. Heninger
41. C. C. Neidig
42. W. U. Lemons
43. G. L. Schaefer
44. G. M. Parrish
45. L. E. Webster
46. E. L. Shuford, Jr.
47. C. Parker
48. J. H. Batsche
49. W. H. Lynch
50. Martin L. Walter
51. R. J. Poff
52. R. A. Devlin
53. R. L. Wolfe
54. Sherman L. Bratton
55. J. T. Quarll
56. Walter I. Wilkins
57. H. L. Armstrong
58. Glen R. Bach
59. Clark S. Burgett
60. George H. Elliott
61. Roy E. Selement
62. Samuel F. Lipton
63. Hugh D. Laird
64. Harry L. Cotton
65. Noel C. Elberson
66. George Wm. Clark
67. Lawrence B. Adams
68. John J. Wermuth

MAJOR JOSEPH R. JEFFERIS, U. S. A.

Major Joseph R. Jefferis, V. C., R. A., reported for temporary duty in the Veterinary Division, Surgeon General's Office,

Washington, D. C., June 21st, 1919. Upon completion of this duty he will take station at Fort Keogh Remount Depot, Montana, as the Veterinarian.

Major Jefferis sailed for France from Hoboken, N. J., August 7, 1917, and arrived at St. Nazaire August 20, 1917. He was assigned to duty commanding Veterinary Hospital at A. R. D., Base Section No. 1. On September 10, 1917, he was ordered to the Medical Supply Depot, Cosne, France, in charge of veterinary supplies till November 14th, when he returned to Veterinary Hospital at St. Nazaire as Commanding Officer. July 5th, 1918, transferred to Saint Aignon as Division Veterinarian, 41st Division. Was later transferred to 1st Replacement Depot as the Veterinarian. May 21st, 1919, was ordered to Le Mans to command Veterinary Hospital No. 11. Proceeded to Brest in charge of this organization and sailed from that port on S. S. President Grant, May 28th, 1919, arriving in Boston June 9th, 1919, and this hospital was demobilized at Camp Devens.

MAJOR WALTER G. WHITE, U. S. A.

Major Walter G. White, U. S. A., was honorably discharged from the Veterinary Corps, United States Army, at Washington, D. C., on June 27th, 1919.

Major White was first commissioned in the Veterinary Corps as a 2nd Lieutenant on June 28th, 1917, and reported at Camp Hancock, Ga., for active duty on August 24th, 1917, where he was assigned to the 109th Field Artillery, 28th Division. October 10th he was ordered to Auxiliary Remount Depot No. 308 as the Veterinarian, and while at that station was promoted to the rank of First Lieutenant. On January 16th, 1918, he was ordered to Camp Upton, Long Island, N. Y., to assist in organizing Veterinary Hospital No. 6 for overseas service. He was promoted to the grade of Captain, V. C., March 9th, 1918, and sailed for France with Veterinary Hospital No. 6 March 28th, 1918. Arriving France this organization was ordered to Neufchâteau for station. On September 18, 1918, Captain White was transferred to the 32nd Division as Division Veterinarian and served with this division in the Argonne offensive. The division was either on the front lines or immediate reserve from this time until the armistice was signed. After the armistice, the division formed part of the forces of the Army of Occupation and was stationed for some time in Germany. On December 22, 1918, Captain White was transferred as Division Veterinarian to the 2nd

Division, where he served until May 15th, 1919. Captain White was promoted to the grade of Major on May 3rd, 1919, and was transferred to the 90th Division on May 15th, returning with this division to the United States, and arriving in this country on June 7th, 1919.

Upon the demobilization of the division, Major White reported to the Veterinary Division, Surgeon-General's Office, for temporary duty and consultation prior to his discharge.

MAJOR BURT ENGLISH, U. S. A.

Major Burt English, U. S. A., who has just returned from overseas, was a recent visitor at the Veterinary Division, Surgeon-General's Office. As a Captain, Veterinary Corps, Regular Army, he was Division Veterinarian, 76th Division, where he organized the divisional veterinary service and sailed for France with this division on July 5th, 1918, arriving in Liverpool, England, July 12th, and in France July 15th, 1918. He was promoted to the grade of Major, Veterinary Corps, National Army, February 26th, 1918.

Upon arrival in France he was stationed with the division St. Amond, Montrond. On July 25th he was ordered for temporary duty at St. Aignon. August 10th ordered for temporary duty at Neufchâteau Veterinary Hospital No. 6. On August 25th he was assigned to duty with headquarters 6th Army Corps, which was being organized as a part of the First Field Army for duty in the offensive on the Toul front, and participated in the first drive of this corps in that sector (St. Mihiel drive).

In December the 6th Corps followed the Third Army northward to the border of Germany and took station in Southern Luxemburg. Major English remained as Corps Veterinarian until the corps was demobilized April 15th, 1919, when he was ordered to headquarters Third Army at Coblenz, Germany, as Corps Veterinarian, 4th Corps. He returned to the United States with the 4th Corps.

MAJOR GEORGE A. HANVEY, U. S. A.

Major George A. Hanvey, U. S. A., just returned from overseas service, has been ordered to the Veterinary Division, Surgeon-General's Office, for temporary duty.

Captain Hanvey was assigned as Division Veterinarian, 84th Division, stationed at Camp Taylor, Ky., on January 14th, 1918. He was promoted to the grade of Major, Veterinary Corps, Na-

tional Army, on February 20th, 1918. As Division Veterinarian he sailed for France on September 9th, 1918, and arrived in Liverpool, England, September 21st, 1918, and proceeded to Ramsey Rest Camp, England, where the division stayed three days, then crossed the English Channel from Southampton to Le Havre, France.

He remained with the 84th Division until November 8th, 1918, when he was transferred to the Advanced Veterinary Hospital No. 5 at Toul, France, as the Commanding Officer. On January 27th, 1919, he was transferred to the 88th Division as Division Veterinarian. On April 28th, 1919, he was again transferred to Veterinary Hospital No. 6 as Commanding Officer, and placed on temporary duty in the office of the Veterinarian, Advance Sector, S. O. S., until Veterinary Hospital No. 6 prepared to leave France for the United States. This organization sailed from Brest, France, on the U. S. S. Agamemnon June 10th, 1919, and arrived in Hoboken, N. J., June 18th, 1919. They then proceeded to Camp Upton, where the hospital was demobilized, on the completion of which Major Hanvey was transferred to the Surgeon-General's Office.

MAJOR D. H. UDALL, U. S. A.

Major D. H. Udall was commissioned Major, V. C., October 3, 1917, and reported for active duty on February 11th, 1918, at the M. O. T. C., Camp Greenleaf, Ga. After completing the course of training at this camp, he was assigned as Division Veterinarian, 86th Division, and reported at Camp Grant April 15th, 1918. Sailed from New York with the 86th Division on September 8th, arriving in Liverpool, England, September 23rd. Sailed from Southampton September 24th, arrived at Le Havre, France, on the 25th, and proceeded with the 86th Division to St. Nere de Cubzac, arriving on the 28th, where the 86th Division was stationed, where it was used as a replacement unit. On November 15th was transferred from the 86th Division to the First Depôt Division at St. Aignon. January 1st, 1919, relieved from this duty and ordered to report as Commanding Officer, 18th Veterinary Hospital, stationed at Souzi. February 8th, 1919, transferred to 7th Veterinary Hospital as Commanding Officer. February 14th, 1919, transferred to the A. E. F. University at Beaune for duty as instructor in Physiology, Veterinary Department. Ordered to Brest for transfer to the United States on June 8th, and sailed from that port on the S. S. Great Northern

June 30th, arriving in New York July 6th. July 11th reported for temporary duty in the office of the Surgeon-General, Veterinary Division, Washington, D. C., prior to being discharged from the service.

MAJOR GEO. B. M'KILLIP.

Major Geo. B. McKillip, U. S. A., was commissioned Major, V. C., December 11th, 1917, and reported for active duty on December 28th, when he reported for temporary duty in the office of the Surgeon General, Washington, D. C. December 28th to January 17th, 1918, took course of veterinary instruction at Washington, D. C. January 18, 1918, reported to Camp Upton, N. Y., as Commanding Officer, Veterinary Hospital No. 6, where this hospital was organized and trained prior to its transfer for overseas service. On March 27th, 1918, sailed from New York with Hospital No. 6 on the S. S. Olympic and landed at Brest, France, April 4th, 1918. April 4th to 7th the Hospital No. 6 was at the Rest Camp just outside of Brest. The Hospital No. 6 was then ordered to Neufchâteau, arriving at that station on April 11th. On September 12th relieved of command of Veterinary Hospital No. 6, Neufchâteau and assigned as assistant to the Chief Veterinarian of Base Section, Headquarters Bordeaux, Base Section No. 2. September 20th Headquarters Base Section was transferred to St. Nazaire. From September 21 to March 1, 1919, was assigned as Assistant Chief Veterinarian, Base Section, which was stationed at St. Nazaire. March 1st, 1919, relieved as Assistant Chief Veterinarian, Base Section No. 2, and ordered to Beaune, Côte d'Or, A. E. F. University, as Director of Veterinary Department of the College of Medicine, until June 17th, 1919. Relieved from this duty and ordered to report to St. Aignon for embarkation to United States. Left Brest on S. S. Great Northern June 30th and arrived in Hoboken July 6th, 1919. Was ordered to Camp Dix, N. J., for demobilization. Transferred to Washington, D. C., for temporary duty in the Veterinary Division, office of the Surgeon-General, upon completion of which duty he was discharged July 12th, 1919.

MAJOR HENRY W. PETER, U. S. A.

Major Henry W. Peter, U. S. A., joined the 38th Division, Camp Shelby, Miss., as Division Veterinarian, November 27th, 1917, and sailed with this division from Hoboken on October 2nd, 1918, arriving at Southampton, England, October 7th, 1918.

Sailed from that port October 11th, 1918, arriving at Le Havre, France, October 12th. Left Le Havre October 14th and arrived at Nantes training area with the 38th Division, where it was used as a replacement division. On November 11th was transferred from Nantes to St. Aignon for reassignment, and was assigned as Commanding Officer, Veterinary Hospital at Leux, Côte d'Or, arriving this station on November 27th, 1918. This hospital was in course of construction and when completed had acommodations for 200 animals, and the personnel consisted of Veterinary Hospitals No. 14 (white) and No. 21 (colored), and one labor battalion (colored). Remained in command of this hospital until May 27th, 1919, when both hospital units entrained for La-Mans preparatory to returning to the United States. On May 25th, 1919, was assigned as Commanding Officer No. 14 and sailed with this unit from Brest on the battleship Kansas June 16th, arriving at Newport News June 27th, where the hospital was demobilized. Upon demobilization of this unit Major Peter reported for temporary duty to the office of the Surgeon-General, Veterinary Division, Washington, D. C., preparatory to being reassigned to duty in the United States.

MAJOR WILLIAM F. GUARD, U. S. A.

Major William F. Guard, U. S. A., was honorably discharged from the Veterinary Corps, United States Army, at Washington, on June 25th, 1919. Major Guard was first commissioned as a 2nd Lieutenant, Veterinary Reserve Corps, on December 17th, 1917, and called to active duty January 28th, 1918. He reported at Camp Lee, Virginia, on February 1st, 1918; assigned to duty with Veterinary Hospital No. 3. On April 1st, 1918, he left Camp Lee with this hospital and sailed for France from Newport News, Virginia, on April 14th, 1918, arriving at St. Nazaire on June 1st, 1918. Upon arrival in France he proceeded to Camp Valdehon, where he remained on duty until September 12th, 1918. On this date he was relieved from duty with Veterinary Hospital No. 3 and ordered to duty in the office of the Chief Veterinarian at Headquarters Advance Section, S. O. S. On November 20th, 1918, he was relieved from duty in this office and ordered to Verdun (Meuse) for duty as the Commanding Officer of the veterinary hospital. On September 27th, 1918, he was promoted to the grade of Captain; promoted to the grade of Major on June 3, 1919. Relieved from duty at Veterinary Hospital and ordered to the United States May 23rd,

1919. Arrived in Hoboken, N. J., June 19th, 1919. Reported for temporary duty in the office of the Surgeon-General, and upon completion of this duty was discharged.

PROMOTIONS IN THE VETERINARY CORPS, AMERICAN EXPEDITIONARY FORCES.

The following Majors have been promoted to the grade of Lieutenant Colonel:

1. John H. Gould
2. Richard H. Power
3. Robert Vans Agnew

The following Captains have been promoted to the grade of Major:

1. Andrew E. Donovan
2. Herbert S. Williams
3. Wm. C. Van Alstyne

The following 1st Lieutenants have been promoted to the grade of Captain :

1. H. P. Gill
2. F. C. Sager
3. J. C. Johnson
4. L. R. Smith
5. O. E. McKim

The following 2nd Lieutenants have been promoted to the grade of 1st Lieutenant:

1. C. A. Beall
2. F. H. Steele
3. R. C. Coulson
4. J. J. Riordan
5. W. A. Litton
6. E. C. Cavanaugh
7. G. W. King
8. W. H. Boswell
9. J. M. Atterberry

The following Captains in the Veterinary Corps, retired, are promoted to the grade of Major on the retired list:

1. Alexander McDonald
2. Daniel LeMay
3. Walter R. Grutzman

The following officers have resigned from the Veterinary Corps, Regular Army, during the past month:

1. 2nd Lieut. Henry L. Sommer, V. C., who was on duty at Camp Lewis, Washington.

2. 2nd Lieut. Joseph W. Burby, V. C., who was on duty at Camp Gordon, Georgia.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On duty June 11, 1919.	On duty July 11, 1919.
Colonels	0	0
Lieutenant Colonels	5	6
Majors	74	68
Captains	193	182
1st Lieutenants	430	382
2nd Lieutenants	432	357
Total	1126	995

AD MISCEL

A FAREWELL BANQUET COMPLIMENTARY TO LIEUT. COL. L. A. MERILLAT.

THE JOURNAL is in receipt of the news from France that a farewell banquet was given to Lieut.-Col. Louis A. Merillat, V. C., of Chicago, by members of the faculty of the National School of Veterinary Medicine at Alfort, May 24th, 1919.

The banquet was held in the council chamber of the school, and many interesting talks were given. Some of the subjects dwelt upon were: The promotion of closer international relations in regard to Veterinary Science and Animal Husbandry; and the possibility of holding the International Veterinary Congress in the United States in the near future.

The following prominent members of the profession were present at the banquet: President Vallée; Professors Kaufman, Petit, Moussu, Dechampre, Cadiot, Coquet, Bourdelle, Railler, and many of the assistant professors. Mr. Pierre Blaziot, ex-member of the French Veterinary Mission of New York, and Capt. William D. Odou, V. C., U. S. A., liaison o....cer, Veterinary Corps, A. E. F.

Dr. Fred Low has received his discharge from the Army and is now located at Oakes, Iowa.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

COMMITTEE ON LEGISLATION.
OFFICE OF THE SECRETARY.

185 NORTHWESTERN AVE., MILWAUKEE, WIS.,
June 21, 1919.

To the Officers and Members of all State, Divisional and District Associations, and Members-at-Large, N. A. of B. of A. I. V.:

GREETINGS:

An amendment to the Agricultural Appropriation Bill introduced in the U. S. Senate by Senator Walsh of Montana provides for an additional appropriation of $100,000 for the fiscal year beginning July 1st, 1919, to be used for Equine Meat Inspection. The amendment provides that any part of this appropriation not used for Equine Meat Inspection is to be applied to other Meat Inspection by the Bureau of Animal Industry.

The Committee on Legislation of the A. V. M. A. desires the coöperation of the B. A. I. Veterinarians in the achievement of this much-desired end. You are therefore earnestly urged to do your utmost in the effort to secure the enactment of this amendment. Act at once! There is no time to lose!

As this amendment is now being considered in conference, it is especially desirable that telegrams be sent to the following Members of Congress:

REPRESENTATIVES.

REPUBLICAN.	DEMOCRATIC
Gilbert N. Haugen, of Iowa, *Chairman.*	Asbury F. Lever, of S. Carolina.
James C. McLaughlin, of Michigan.	Gordon Lee, of Georgia.
Sydney Anderson, of Minnesota.	

SENATORS.

Carroll S. Page, of Vermont.	Thomas P. Gore, of Oklahoma.
George W. Norris, of Nebraska.	Ellison D. Smith, of South Carolina.
William S. Kenyon, of Iowa.	

Remember, it is the personal touch that counts. Urge prominent Live Stock Men and other influential friends of the above-mentioned Members of Congress to wire them urging their support of the Walsh Amendment.

Bills for refund of telegraph tolls in connection with the above should be forwarded direct to Dr. W. Horace Hoskins, chairman Committee on Legislation, A. V. M. A., 338 E. 26th Street, New York, N. Y., with copies of telegrams attached.

Fraternally yours,

S. J. WALKLEY,

Sec. to Committee on Legislation, A. V. M. A.

A FEW FACTS ABOUT LOUISIANA AND NEW ORLEANS.

NEW ORLEANS IN 1719

The settlement of a French colony in Eastern Canada was the beginning of romance and tragedy in Louisiana, when in 1673 Pere Marquette and Louis Joliet received an inspiration from the Indians, who told them wonderful tales of a mighty river which flowed west from the Great Lakes to the Pacific Ocean, where the colonists could, ultimately, open up channels of trade with India. This was 131 years after the discovery of the "Father of Waters" by Ferdinand De Soto who, in his vain hunt for gold across the heart of the Gulf States, finally returned to Mississippi much depressed over his tragic fate. He fell sick with the fever and died, as he had lived, a daring leader. His body was deposited in the depths of the rolling Mississippi as a sacrifice to the wonderful country and natural drainage system he had discovered.

Louisiana experienced many gloomy days as the English, Spanish and French were eager to claim her as their own, at whatever cost it might be. However, the determined spirit of

the French predominated, and in 1718 Bienville, a gallant Frenchman who had been in America 19 years, was informed by an old squaw whom he found seated beneath a moss-covered oak, chanting revelations from the "Great Spirit," that the time would come when between the river and the lake (Pontchartrain) there would be as many houses of the white man as there were trees then.

Oak made historic in "Evangeline."

In 1755 the English drove the French from Acadia, now known as Nova Scotia, and history records it as "The Exile of the Acadians." Later Longfellow immortalized the tragedy and their final settlement in Louisiana along the Bayou Teche, Atchafalaya and Acadian shores in his beautiful story of Evangeline. Her name was originally Emeline la Biche, but owing to the particular sweetness of her character and gentle disposition she was no longer called Emeline but Evangeline, meaning "God's little angel." Longfellow traces her wanderings in search of her lover back to Philadelphia, and there says no more, but history asserts that she died in Louisiana, and was buried on the bank of the Teche under a gigantic oak which is now known as the Evangeline Oak, and if this is true, the writer has had the honor of standing beneath the oak and viewing the

country where almost one hundred and fifty years ago took place a happy reunion between the scattered Acadians.

Southwestern Louisiana is known as the land of the "cajuns," which is a corruption of the word Acadian, and their language, customs and superstitions have filtered into every parish in the State, and into a large number of counties in adjacent States. They are a simple-minded, prolific and home-loving people, and until only recently have many of their lives been touched by modern ideas. The land they own is measured in arpents, which is an old French calculation for land, and the term is recognized in all legal transfers of property. I believe an arpent originally was equivalent to an acre in English measure.

In the meantime Louisiana and the City of New Orleans lived happily under the French flag, but in about 1768 the Spanish took possession of the country and landed in New Orleans for the purpose of establishing a Creole* form of government. All went well until O'Reilly, an Irishman in the Spanish army, decided to execute the French leaders who fought the change. In October, 1769, five patriots were led to the Spanish barracks and shot, thus becoming the first Louisianians to give their blood for the cause of freedom.

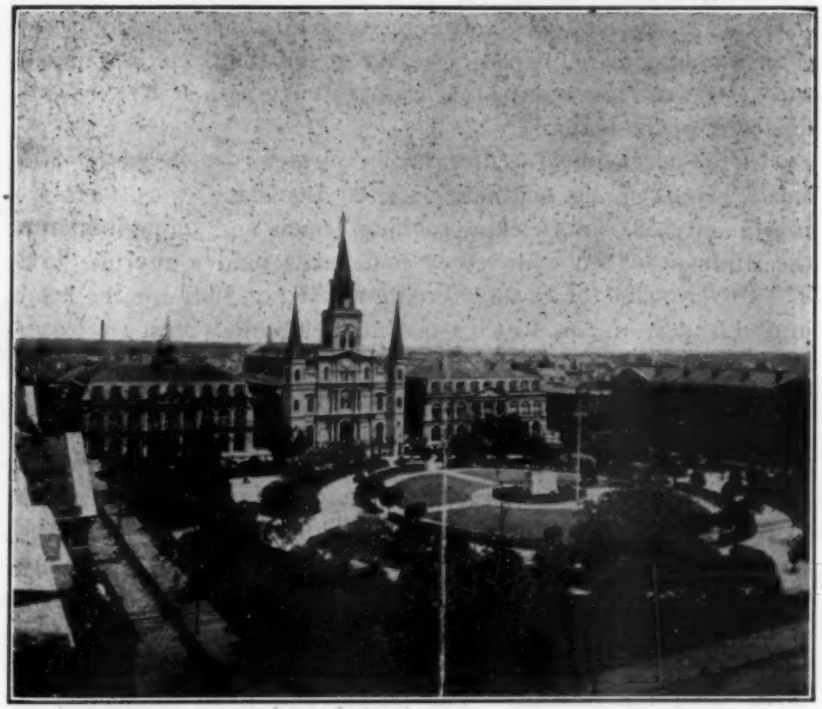
O'Reilly endeavored to place the colony under just laws, and erected a court called the Cabildo, which was the seat of government for the Superior Council, and combined many of the powers of the Supreme Court with the present Legislature. New Orleans now had a population of a little more than 3,100, including negroes. The city and country flourished and the people became a mixed race, notably French, Spanish and American.

In 1781, the year Cornwallis surrendered to Washington at Yorktown, Va., Galvez, a daring young Spanish Governor of Louisiana, won a brilliant victory over the English at Pensacola, Florida, as he had previously done at Natchez, Miss., and Baton Rouge, La. This virtually settled the American Revolution, but left Louisiana under Spanish rule. However, the people prospered and a few years later appeared the first newspaper in the State, called the Le Moniteur de la Louisiane. In 1795 the indigo crop failed on acount of an insect, but this made way for the first adventure in raising sugar cane, which has proven to be such a splendid success.

---

* A French Creole in Louisiana is a native descended from French ancestors who had settled in the State. Some of the most prominent white families in Louisiana are, therefore, Creoles.

In 1800, through a secret treaty negotiated by Napoleon, Louisiana was ceded by Spain back to France. The transaction was kept a secret for a year on account of the strained relations between England and France. After the facts became known, the United States Government objected to such a powerful man as Napoleon holding so much territory in America and commenced to lay plans whereby there could be purchased from France the Island of New Orleans and the Florida country. Finally two great Americans, Robert R. Livingston and James



FAMOUS JACKSON SQUARE, NEW ORLEANS.
Showing old Spanish Cabildo and St. Louis Cathedral in background.

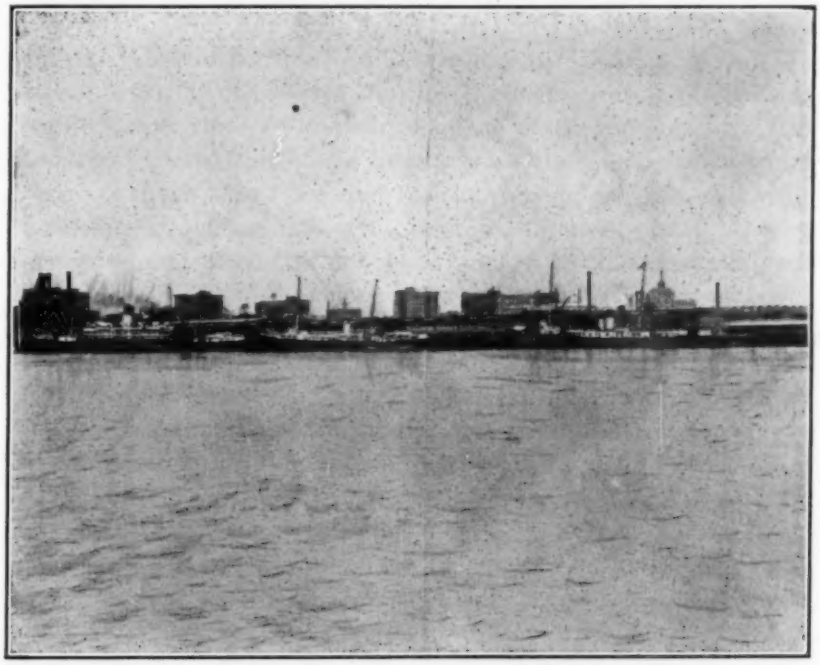
Monroe, went to France, and after much discussion, bought all of Louisiana from the Mississippi to the Rocky Mountains for fifteen million dollars. The papers were signed April 30, 1803. Congress approved the treaty, but with the understanding that the territory should be divided into two parts, one to be called the District of Louisiana and the other the Orleans territory. In 1804 President Jefferson appointed Claiborne the first Governor of the present State, and in the meantime New Orleans had grown to 10,000 population, while it was shipping millions of dol-

lars' worth of cotton, sugar, molasses and tobacco. The city streets were not well kept and were poorly lighted. The people preferred to lavish their pride on their houses, which were built with large high rooms, broad halls and wide galleries. The life of the Creole was happy and gay, and the city was unusual in this distinction. The people were prosperous, and the plantation owners always extended a glad hand to the wayfarer, inviting him to tarry as long as he liked, for food was a-plenty.

The next great move, which finally resulted in much grief, was the importation of slaves to work in the cotton and cane. Later, in 1812, after Louisiana had a population of 60,000, Congress, after a long, spirited debate, whether or not the Creoles, a mixed race, could be true to any other country but Spain or France, admitted it to the Union.

In the meantime the Baratarian pirates, who lived on two small islands on the southern coast of Louisiana, were terrorizing the city of New Orleans, robbing vessels and smuggling into the State goods on which they had never paid a revenue tax. The Governor of the State offered a reward of $500 for the head of the leader, and he in turn became angry and filed a counter offer of $500 for Governor Claiborne's head. The Baratarians were so bold and well fortified that no one dared make a claim for the reward. Therefore the leader went about unmolested. The Chief Executive asked the Legislature to put a stop to these unlawful activities, but they lacked the courage and the finances to proceed against 500 outlaws. Captain Jean Lafitte was the leader of the Baratarians, yet he possessed a number of unusually good qualifications which were later recognized by General Andrew Jackson, who reached New Orleans December 1, 1814, for the purpose of fortifying the city and defending it against attacks from the British. The people had little confidence in Jackson, as he was a strenuous character from the west, and did not appear to have the polish and training of the British leaders. However, he proceeded to organize his troops, which were a mixture of Louisiana, Mississippi, Kentucky and Tennessee soldiers, with Baratarians, Indians and negroes, and on the 8th of January, 1815, the battle of New Orleans was won. This was a brilliant victory, but it had its regrets, inasmuch as it was fought the day after peace was declared between America and England. Following the battle the people of New Orleans went wild with enthusiasm, which was a splendid tribute to the military genius

of General Jackson. Notwithstanding the honor the people paid him, the Legislature passed a resolution thanking other heroes in the conflict, but purposely omitted Jackson because he had dared to usurp the power of State rights by placing the city of New Orleans under martial law, and for that he was brought before the court and fined $1,000. He paid the fine and admonished every citizen to forever obey the law. The rebuke was not overlooked, as Congress, some years later, refunded the fine with interest, which amounted to about $30,000.



Sky line, City of New Orleans, from the Mississippi River.

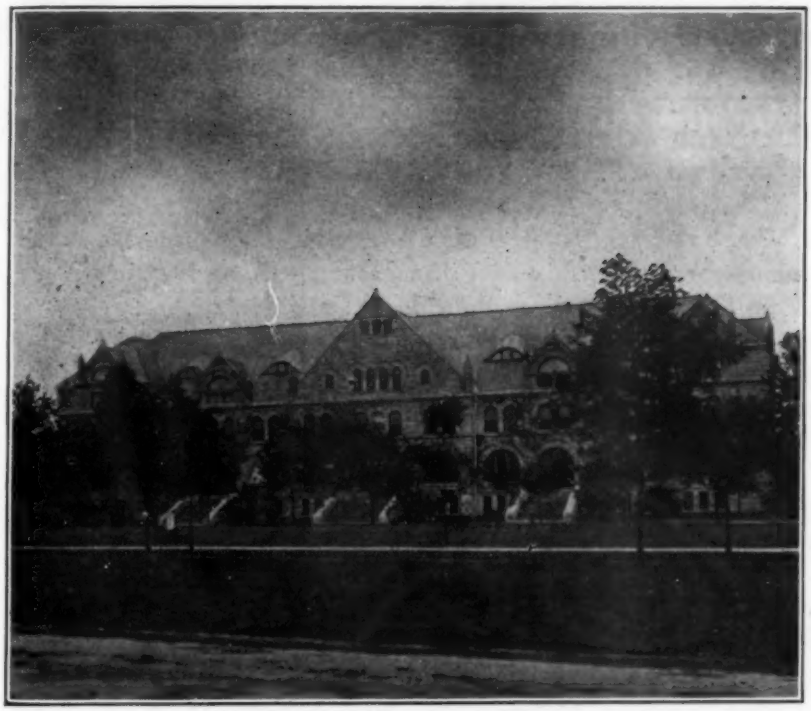
Following the victory the people became united, Louisiana was saved, and the Creoles and Americans were joined in a common cause. From the time the first Governor was appointed there appear both Creole and American names in the long list of Governors between 1816 and the present time. Louisiana prospered, settlers came in and tilled the soil. Plantations were started which raised cotton, cane and tobacco. Schools, churches and villages were built. In 1830 the first railroad was constructed from New Orleans to Milneburg on the south shore of Lake Pontchartrain. Levees were built, but they were inadequate and the drainage and water system paved the way for

grief. In 1853 occurred a great yellow fever epidemic, following the arrival of a vessel from Rio de Janeiro, which bore several infected immigrants who took sick and died. The fever spread. Many people left for the North, and those who remained awaited their fate. The first week in August nine hundred and forty-seven deaths were recorded, and on the 22nd of the same month the fever was at its peak when two hundred and eighty-three died in one day. In the meantime medical science had not discovered the cause, but a few careful observers had noticed that the negroes suffered much less from the attacks. The colored population lived amid very unsanitary conditions, in unprotected cabins frequently surrounded by pools of stagnant water. These conditions exposed them more directly to the mosquito, and to make themselves more comfortable, every night they would burn a mass of old rags which produced a smudge of dense smoke sufficient to protect them from the mosquito. Later, when it was discovered that a certain species of mosquito transmitted yellow fever the apparent immunity enjoyed by the negro was fully understood. New Orleans emerged from the epidemic more determined and stronger than ever to fight difficulties. Rigid quarantines were instituted. Gigantic levees erected, cisterns relegated to the junk heap, and a perfect water system established, so that today yellow fever, in the minds of the younger generation, is ancient history, and the city employs the use of the most sanitary equipment.

The next great conflict was the war between the States, and New Orleans and Louisiana had its share of the sorrow, as the mouth of the Mississippi was a contested point between the two armies, since in the control of the "Father of Waters" would lie a strategic feature of untold military value. On April 19, 1862, Admiral Farragut, in command of the Federal fleet, finally broke through and steamed up the river past New Orleans.

From the early days, when the French, English and Spanish were claiming Louisiana, up to the close of the Civil War, the people of the Pelican State had a stormy time. They experienced many joys and sorrows, but never faltered nor abandoned the cause of ultimately establishing a permanent State. Today the Commonwealth and the city is one of prosperity and contentment. The city of New Orleans, with a population of over 400,000, in the southeast corner of the State, and Shreveport, with a population of 35,000, in the northwest corner,

are both splendid monuments of industry which are significant of pride and diligence. Schools and churches cover the land and the educational system is making some remarkable improvements. Tulane University (New Orleans) and the Louisiana State University (Baton Rouge) are two well-equipped institutions which should command attention from those who are seeking the best educational facilities. Louisiana offers unusual attractions to the homeseeker, commercial and professional man. The people are richly endowed with the spirit of good old Southern hospitality and are quick to recognize quality.



Gibson Hall, Tulane University, New Orleans.

For months you have been hearing the call to come to the Crescent City November 17 to 21 inclusive, and for the next three months you will hear the invitation repeated, and the appeal frequently emphasized. Do not overlook this great occasion to see an interesting feature of our country, as that and the Association will broaden our scope of vision, and make us glad that we are privileged to grasp such a magnificent opportunity.

E. I. SMITH,

Sec.-Treas., Committee on Arrangements, L. V. M. A.

COMMITTEE ON LEGISLATION.

The passage of the Agricultural appropriation bill marks two achievements for the profession. The increased pay of those who have heretofore received twenty-five hundreds of dollars or less annually, and the first step toward a fixed increase of those who have heretofore had a minimum salary of $1400 to $2000.

The securing of the reëstablishment of Equine Meat Inspection and an appropriation of one hundred thousand dollars that may be used for this purpose will help solve an economic problem of world-wide importance.

W. Horace Hoskins, *Chairman.*

NEW YORK STATE VETERINARY COLLEGE, NEW YORK UNIVERSITY.

The following list of graduates received their diplomas at the commencement exercises on June 11th, 1919, at the New York State Veterinary College, New York University:

Abramson, Alexander H., 444 Grand street, New York City.

Benson, Clarence O., Wassaic, N. Y.

Carabba, Victor, 178 Mulberry street, New York City.

Felder, Morris, 142 Manhattan avenue, Brooklyn, N. Y.

Koslow, Louis, 1766 Prospect place, Brooklyn, N. Y.

Kreindler, David A., 2750 West 17th street, Coney Island, N. Y.

Lebish, Jacob, 293 Henry street, New York City.

Spevack, Victor, 43 Nostrand avenue, Brooklyn N. Y.

Wright, James M., Somerville, Mass.

The Following prizes were awarded: Faculty Gold Medal, Victor Carabba; Alumni Prize, Jacob Lebish; Lt. W. W. Yard Prize (1st), David A. Kreindler; Lt. W. W. Yard Prize (2nd), Victor Spevack; Prize in Therapeutics, Victor Carabba; Prize in Canine Surgery, Victor Carabba.

The fourth-year curriculum will be in force for the year 1919-20.

Henry Henning, *Secretary, Faculty.*

Captain Joseph F. Crosby was transferred in July from Camp Grant, Ill., to Camp Knox, West Point, Ky.

OTHER ASSOCIATIONS

COLORADO VETERINARY MEDICAL ASSOCIATION.

The seventeenth semi-annual meeting of the Colorado Veterinary Medical Association, held at Fort Collins on June 5 and 6, was well attended and proved of unusual interest.

The committee appointed to study the question of a uniform price for the administration of biologic preparations reported progress but was unable to make a definite recommendation.

Dr. Charles G. Lamb, chairman of the Committee on Legislation, reported that all of the bills recommended by the Association at its winter meeting failed of passage in the Legislature. He explained the amendments which were made to the stallion bill so that the veterinarians might be informed on making examination for soundness.

Three new members were added to the roll, as follows: Wm. H. Feldman, John A. Bestall and Charles A. McKim.

The president's address, by Dr. H. E. Kingman, called attention to the need of better preparation and organization for putting through necessary legislation, and also dealt with the possibility of making the college more useful to the profession by increasing the facilities for laboratory diagnosis and by the addition of a summer school.

Lieut. H. G. Wiegand, who had spent nearly two years in France, related his experiences as an army veterinarian in that country.

Major Wallace M. Decker, who had just returned from France, was called upon, and in a few extemporaneous remarks told of the conditions as he found them in the army.

The question of "Cæsarian Section in Sows" was well discussed by Dr. N. J. Miller, who was followed by Dr. A. A. Hermann on the same subject. Dr. Miller finds that cæsarian section is not only frequently desirable, but in a large percentage of cases both the mother and the young may be saved.

Dr. A. W. French read a paper on "Sheep Diseases," in which he discussed more especially necrobacillosis, scab and pneumonia.

Dr. C. E. Salsbery, of Kansas City, read a paper on "Diseases of Fowls," which he said were becoming of great importance to veterinarians, owing not only to the prevalence of disease in this

species, but also to the value of the poultry industry. He discussed particularly cholera, white diarrhœa and tuberculosis. He stated that vaccination against cholera with the killed organism was proving of value in the hands of many, and was becoming a standard procedure.

Dr. A. T. Kinsley, of Kansas City, discussed the question of "Contagious Abortion in Cattle," which created much comment and called forth many questions.

Case reports were given by Drs. R. H. Bird and G. H. Glover.

The high point in the clinic was reached in a demonstration on a number of sterile cows, conducted by Dr. George F. Jungerman, of Hiawatha, Kansas. Dr. Jungerman not only demonstrated the actual condition in many of the animals, but ably discussed his method of handling such cases. There was also a demonstration of diseased generative organs from both cattle and hogs selected at the packing houses in Denver and shipped up for the meeting.

Many other interesting cases were presented for diagnosis and operation.

The entertainment provided for the ladies consisted of a tea given at the home of Mrs. R. F. Bourne on the afternoon of the first day and a banquet and ball in the evening.

I. E. Newsom, *Secretary.*

NEW JERSEY SCHOLARSHIP.*

By William Herbert Lowe, Paterson, N. J.

As the thought of a New Jersey Scholarship first came to my mind it seemed like a dream, impossible of realization, but suddenly there appeared before me the Coat of Arms of New Jersey, the plows and the horse's head, with the motto, "Liberty and Prosperity." As I started out for the Scholarship a mental vision of our Coat of Arms was ever before me. Let us think of the picture for a moment.

The interpretation of the plows and the horse's head were to me convincing proof that the early settlers of New Jersey, the colony as you know, was one of the original thirteen colonies that formed the United States of America, unquestionably realized the fundamental importance of agriculture and animal husban-

* An address delivered June 10, 1919, before the Alumni Association, New York State Veterinary College, New York University.

dry, the basis upon which veterinary science is founded, for there can be no successful agriculture without animal husbandry, and animal husbandry cannot attain its highest and most efficient state of development and preservation unless the laws of life — vegetable and animal — are diligently studied and the vital principles governing the same intelligently applied in the cultivation of the soil and in the propagation, development and maintenance of all classes of animals in a state of domestication.

The application of science to agriculture and animal husbandry is making for results that spell a greater "Liberty and Prosperity" than the world has ever known. The treatment of animal diseases will be the least part of the work of the veterinarian in the years to come. The greatest field for his labors is in the development and management of an animal husbandry under conditions that will not invite infection, disease and unnecessary loss. An economic veterinary science that will at the same time protect the health and safeguard the lives of the human population from infection and infestation of animal origin.

The people of New Jersey are progressive and patriotic. In agriculture, in education, in science, in invention, in manufacture and in commerce her people have always occupied a prominent position, and is it any wonder that the veterinary profession of that State should blaze the way for the establishment of the first State Veterinary Scholarship in America? I think not. How could they do less and be true to her time-honored traditions?

New Jersey has produced some of the greatest minds, and there also seems to be an attraction within her borders for those born elsewhere.

New Jersey was the birthplace of that eminent veterinarian and sanitarian, Daniel E. Salmon, the man who founded at Washington what has become the greatest veterinary and animal bureau in the world, and was its chief for twenty-one years. It is interesting to note that the organization of this bureau occurred in 1884, the same year as the V. M. A. of New Jersey was organized.

Salmon's knowledge of the geographic, railroad and other advantages of the state led the national government to locate the largest and most important animal quarantine station of this country temporarily at Garfield, and permanently at

Athenia, which is within a three-mile drive of my home and about twelve miles from the college.

This is the quarantine station where imported cattle, sheep, swine and other livestock arriving at the port of New York from all parts of the world are held in quarantine before being released for shipment to points of destination throughout the length and breadth of this broad land. The livestock arriving at this quarantine station are mostly breeding animals of the choicest blood and the finest pedigree.

It is hardly necessary in this presence to mention that New Jersey furnished New York University with its second chancellor in the distinguished personage of Theodore Frelinghuysen, who was born at Millstone, Somerset County, N. J., March 28, 1787.

That eminent educator and statesman held many important positions in his state and in the nation, including that of Attorney General of New Jersey, United States Senator, and President of Rutgers College.

My home town, Paterson, I am proud to say, gave Nicholas Murray Butler to Columbia University.

The home of the late John Payne Lowe, agriculturist, editor and trustee of the Veterinary College, pioneer in the cause of veterinary education in America, was situated on the banks of the picturesque Passaic, at Little Falls, N. J., of fond recollection to the speaker.

New Jersey was represented at the initial meeting of the U. S. V. M. A., now the A. V. M. A., at the Astor House, New York City, in 1863, and has the distinction of furnishing two presidents to this great organization, both alumni of the A. V. C., now a corporate part of New York University!

The delightful home of Thomas A. Edison is at Llewellyn Park, N. J., but the distinguished electrician spends much of his time in his workshop at West Orange.

Grover Cleveland, born at Caldwell, N. J., is buried at Princeton, and I might add that the present occupant of the White House, *or rather the present President of the United States*, hails from Princeton. These are a few of the men whose works make for "Liberty and Prosperity."

Fellow colleagues, if I am not greatly mistaken, it is such a liberty and such a prosperity that America and the whole world is crying out for today, and let me say that as the fundamental

importance of veterinary science is better understood by the public and its teachings more generally heeded will an enduring and satisfying peace be established throughout the world.

There can be no better evidence of the veterinarian's vision and unselfish love for his profession than the creation by the veterinary alumni of a Scholarship fund.

It seems very fitting and proper that the New Jersey Scholarship should be established in New York University, the great university that has assumed the responsibility of fostering American veterinary education in the cradle of its birth.

It is my very great pleasure to be able to announce at this time the creation of a New Jersey Scholarship fund of $10,000 in New York University, but let it not be assumed that this establishment is made solely by the veterinary alumni of New York University, for such is not the case. The New Jersey movement is a far bigger and broader one than that of any college or university. It has the support of alumni of the Ontario Veterinary College in Canada and the Royal College of Veterinary Surgeons of London, England, as well as of the foremost veterinary schools of the United States. A more devoted and loyal body of men does not exist in any profession, in any state or nation. "Perstare et Præstare," persevere and excel.

Veterinary education means science applied to agricultural pursuits, to animal husbandry, to animal industry; it means the production and conservation of food and clothing for mankind; it means the safeguarding of the human family from disease of animal origin; it means a well-fed people, a healthy people, and a happy people; it means "Liberty and Prosperity."

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORT OF THE COMMITTEE ON THE METHOD OF TEACHING OBSTETRICS AND DISEASES OF THE GENITALIA.

Throughout the history of veterinary education, obstetrics and the diseases of the genitalia have been poorly taught — probably the most poorly taught of any subjects in the veterinary curriculum. There are several reasons for inefficiency. In the first place, most veterinary schools have been located in great

cities, where obstetrics and the diseases of the genital organs play a minor rôle. The general location of the schools in cities has operated to defeat efficient teaching in this field in two ways. In the first place, it has naturally and generally led to the selectiton of a teacher who has had little or no clinical experience with either obstetrics or the diseases of the genital organs. In some cases it has been attempted to overcome this defect by selecting as teacher of obstetrics a veterinarian engaged in country practice, who shall visit the veterinary college at stated intervals in order to give instruction. Evidently this cannot overcome the defect, because the surroundings inevitably make the teaching secondary and the private practice primary. The second cause of inefficient teaching in this field is that in city colleges clinical material for illustrative purposes is not available.

Under these conditions, it is only natural that the teaching of veterinary obstetrics should be very poorly done, as compared with the other branches of the veterinary curriculum. This is very unfortunate, because veterinary obstetrics and the diseases of the genital organs stand at the threshold of all successful animal husbandry and dairying, in which the regular physiologic reproduction of vigorous young is the first essential.

When the literature upon veterinary obstetrics and the diseases of the genital organs is examined carefully, it is found to be scanty, poor in character, and poorly arranged. In the various textbooks upon veterinary obstetrics, few efforts have been made to present the subject in a thoroughly scientific and practical manner. Rather, it is presented as a sort of hodgepodge and jumble of fact, fiction, and conclusion, largely devoid of foundation or correlation. The literature upon the diseases of the genital organs is even worse. By searching here, there, and everywhere one may find mentioned quite a list of diseases of the genital organs. Some of them are found in textbooks upon surgery, others in books on obstetrics, and yet others in works upon medicine. Even in these various groups of literature, the diseases of the genital organs are, with a single exception, not brought together, but scattered here and there, so that the veterinary student has no conception whatever of the diseases of the genital organs as a whole, and has no adequate opportunity in our literature to study them clearly and satisfactorily.

An interesting commentary upon the status of the teaching of obstetrics and the diseases of the genital organs is that the ma-

jority of veterinary students are not seriously urged to procure and study any textbook upon the subject. The state schools of America have, as a class, stood apart from the private schools in teaching from textbooks wherever they are available. In some state schools, however, no text is used in veterinary obsterics. No adequate text exists upon the diseases of the genital organs. Amongst veterinary teachers there has been much difference of opinion regarding the value of textbooks. Taking all the schools together, the prevailing opinion has been that textbooks have but a minor value, especially in the field under discussion. This attitude leads to two serious results in teaching:

1. The student has no secure anchorage upon which to base his studies.

2. The student is taught to disregard the value of veterinary literature, whether upon obstetrics or upon other subjects, and whether standard or current. This attitude is perhaps largely responsible for the very meager libraries of many veterinarians.

The attitude of many teachers of veterinary obstetrics upon the question of a textbook has perhaps been more deplorable than a similar attitude in any other field. Essentially, as I understand them, some teachers of veterinary obstetrics claim that the classroom work is of very scant or no value; that there are no such things as scientific principles in veterinary obstetrics, and that a veterinary obstetrist must finally grow up as a result of his actual experience in the field. In other words, they aver that obstetrics is not teachable by an instructor and can be learned by the student only when out in actual practice. This attitude has always constituted a serious reflection upon instruction in veterinary schools. The position should be that every field of knowledge in veterinary science should be brought before the student in the school, in such a manner that upon graduation he shall be able to apply practically and safely his knowledge in every branch of the work.

Scientific veterinary obstetrics can no more be readily learned by the practitioner in the field, without adequate college training, than anatomy, physiology, surgery, or any other subject. The only way by which veterinary obstetrics can be divorced from quackery is through the medium of adequate scientific college teaching. For this purpose, there are certain fundamentals which should always be kept in mind. In order to teach a subject, there must be the teacher, the student, the equipment, and the material.

The teacher of obstetrics and the diseases of the genital organs must have a thorough scientic conception of the subject. Not only must he know all the fundamental subjects, such as anatomy, physiology, embryology, pathology, and bacteriology, but he must know thoroughly all the forces in parturition and must have had practical experience with animals in both normal and abnormal birth.

The student needs to be well equipped for his work before being admitted to the class in obstetrics. His knowledge of the anatomy of the genital organs should be very thorough. Dr. Dykstra of this committee emphasizes this as an absolute essential. It is discouraging to note that the anatomy of the genital organs of the domestic animals is very poorly taught. As a matter of fact, the descriptions of the genital organs of domestic animals in textbooks upon anatomy are exceedingly crude and loaded with omissions and errors. The defectiveness of literature upon the anatomy of the genital organs might be illustrated by the statement that, until very recently, there did not exist in any veterinary anatomy an illustration of the internal generative organs of the cow of such a character that the organs themselves could be identified by comparing them with the illustrations. Neither does any textbook on anatomy show that the preputial sac of the ruminant and porcine male does not exist at the time of birth, but develops with the advent of puberty. Such errors and omissions might be extended almost indefinitely.

The student should be given a regular course in anatomy, as a part of the general subject. One of the great difficulties which confronts the teacher of anatomy and the teacher of obstetrics is that the genital organs which come to him in the ordinary course of his work are quite largely pathologic. This is especially true of the cow, where perhaps more than in any other animal the anatomy of the genital organs is of great importance. Cows with healthy genital organs do not as a rule find their way to the anatomical laboratory. The teacher of veterinary anatomy and of veterinary obstetrics should consequently seek material from reliable sources for his teaching work. This is best done by visiting the abattoir and securing the genital organs from young animals and from animals which are pregnant, and comparing these with organs which are evidently pathologic.

The veterinary anatomist naturally teaches regarding the form, structure, consistence, and volume of the dead organs. The obstetrist is not interested in the dead organ, except because

it furnishes a basis for understanding the live organ. The obstetrist desires to show the student what the organ is like in a living healthy animal, where it is located, what its consistency is, and its relationship to other organs. For this purpose, he needs have typically healthy genital organs from the abattoir in order that he may show the student in the classroom all that is possible regarding the organ. Later he needs to supplement this knowledge by having the student palpate the organs in living, healthy animals, and in diseased animals.

There are certain fundamental principles in obstetrics which can be taught in the laboratory better than in the clinic. For instance, there are certain principles to be brought out in connection with dystocia, especially with reference to mutation and embryotomy, which are best taught by means of the apparatus which we have come to designate a phantom. It does not need to be elaborate. Almost any sort of box, in crude imitation of an abdominal cavity and genital tract will answer the purpose. With this the student may manipulate a dead fetus, learn the various mutations, and especially get clearly the fundamental principles of embryotomy. In my experience as a teacher of obstetrics I believe that, for the labor required, the laboratory exercises upon embryotomy conducted upon freshly killed newborn calves placed in the phantom have been the most valuable part of the obstetric teaching. Upon this point Dr. Dykstra is in perfect harmony with your chairman, and states: "Throughout the teaching of the entire subject, laboratory instruction is of first importance." He admits freely, however, that he can not duplicate the actual difficulties met in practice and that the work is not complete without actual clinical instruction in obstetrics.

A thorough knowledge of embryology is absolutely essential to a scientific understanding of obstetrics. Many cases of dystocia are due primarily to some aberration in the development of the fetus. The diseases of the fetus cannot be understood until the student has a thorough knowledge of the physiology of the fetus. It is essential, also, to an understanding of the diseases of the genital organs that embryology should be thoroughly studied. For example, one can not comprehend retained placenta unless he knows the structure and the physiology of the healthy placenta of both mother and fetus.

The student must understand very thoroughly also the physiology of the genital organs. He must know the physiologic func-

tions of the ovaries, must understand the influence upon the nerve centers of the ovisac and of the corpus luteum, and must know, so far as can at present be known, the physiology of every part of the genital tract. At present there is a great deal of confused immature enthusiasm regarding the diseases of the genital organs of cattle, where veterinarians are rushing in, assuming that they may render a remarkable service, when they do not know a corpus luteum from a cyst and have no comprehension of the physiology and pathology of either corpus luteum or cyst, or of the ovary as a whole. It should be very clear that a knowledge of the physiology of the entire genital system is the first essential in dealing with these diseases.

The final teaching of obstetrics and the diseases of the genitalia must be conducted in the clinic. The student must be taught upon suitable animals how to palpate the internal genital organs, and by that palpation determine whether they are healthy or diseased, whether the animal is pregnant or non-pregnant, and any other details necessary for a proper diagnosis and prognosis. This palpation and diagnosis should be made upon both healthy and diseased animals. Following, or at the same time, the student needs to have actual observation and experience in dystocia and in the handling of the disease of the genital organs. In the New York State Veterinary College, at Cornell University, I urged for a long time — and there was finally established — an extensive ambulatory or out-clinic, which has been instrumental in making available annually in our clinical work hundreds of cases of diseases of the genital organs and of dystocia. It has proven the most valuable surgical work the college has performed. It has a double value. First — and I have always thought the most important — is the fact that it keeps the teachers in constant touch with the work and familiar with the various plans of handling the difficulties met. I have always held that a clinic is quite as essential for the teacher as it is for the student — that a teacher without constant clinical experience has no business in the classroom for the teaching of clinical subjects. I have also held that this clinic should be a college clinic — not the private practice of the teacher. The animals should be under the teacher's care, in such a way that he can get the greatest possible amount of information regarding the character of the disease for himself, in order that he may make use of it in teaching. The clinic is also essential for student instruction. If it is de-

sired to teach the student regarding the douching of the uterus for chronic endometritis, far more can be taught in one hour of actual clinical work upon the diseased uterus than in any number of hours of theoretical teaching. There are certain principles which can be laid before the student in the classroom, but there are certain applications of these principles which can be taught only in the clinic. The physical aspect and the diagnosis of cervicitis may be taught in outline in the classroom, but they can not be truly well taught except by showing the cervicitis thoroughly in the clinic. The same rule holds in teaching the handling of dystocia. There is no place where it can be taught as effectively as in the clinic. It is unnecessary to demonstrate every possible manipulation. That is impossible in any clinic. However, if the teacher understands the matter of instructing, he can demonstrate the application of all the chief principles of obstetrics with a comparatively small number of cases. No two cases of difficult labor are the same, but there are certain fundamental principles running through all, or nearly all of them which, if the teacher has the proper initiative, can be clearly shown to the student. For example, in extending a retained anterior limb, the principles involved in the mutation may be thoroughly demonstrated clinically with a retained posterior limb, in posterior presentation, but it is necessary that the principle should be demonstrated thoroughly to the student, and the teacher needs one of the two complications in order that he may give the student the best instruction possible.

How the teacher of obstetrics and genital diseases in a city college may offer appropriate instruction to his students is a very complex and embarrassing problem. It has largely been solved by fiction — or perhaps the meaning could be more aptly expressed by the new word *camouflage*. The school has made statements in its announcement intended to lead people to believe that it conducts adequate clinics in obstetrics and the diseases of the genital organs.

The subject of obstetrics and diseases of the genitalia is constantly growing in importance. The expense of keeping breeding females and keeping their young up to efficient age increases each year. The dairying industry is undergoing a critical readjustment. It is highly essential that unusually efficient dairying animals shall breed successfully and regularly, so that the reproduction of valuable stock shall be strengthened and the repro-

duction of poor stock be rendered unnecessary. The keynote to such advancement lies in a better understanding of the genital diseases by veterinary practitioners. This better education must be supplied by the veterinary colleges.

The question is a serious one. Each veterinary college is under profound obligations to furnish education of a high order in this field. It must furnish the capable teacher adequate equipment and abundant clinical material. If a given college can not offer such education, it should provide some means whereby its students may procure it at another institution, either as undergraduate or as post-graduate work.

Every practitioner amongst breeding animals should have thorough education in this field, and a candidate for license ought not be admitted to practice except he can show that he has had ample opportunity to learn the subject — that the college has supplied competent teachers, adequate equipment, and abundant clinic. A mere perfunctory written answer on obstetric questions should not be accepted, unless the examining board knows that the candidate has had the proper opportunity actually to learn the subject in the clinic.

R. R. DYKSTRA.
C. H. COVAULT.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION.

The Oklahoma State Veterinary Medical Association met at the Lee-Huckins Hotel June 30 and July 1. About 75 veterinarians were in attendance and an excellent meeting was held. The principal papers offered were as follows: "How Federal Activities Affect the Local Veterinarians," by D. M. Campbell, Chicago, Ill.; "Hemorrhagic Septicemia in Central Oklahoma," by W. H. Martin, El Reno, Okla.; "Diagnosis and Treatment of Swine Diseases," by A. T. Kinsley, Kansas City, Mo.; "Meat and Live Stock Situation of the World," by R. F. Eagle, Chicago, Ill.; "Formaldehyde and Its Uses in Veterinary Medicine," by R. C. Moore, St. Joseph, Mo.; "Inspections for Interstate Shipment of Live Stock," by J. S. Grove, Oklahoma City, Okla.; "Tuberculosis Law, Interpretation and Application," by E. V. Robnett, Oklahoma City, Okla.

The semi-annual banquet was held at the Lee-Huckins Hotel on the evening of June 30th, with Dr. A. T. Kinsley as toast-

master. The association was favored with an address by a prominent cattle breeder who made the timely suggestion that veterinarians, and especially State and Federal officials, should take greater pains to avoid publishing the news when "reactors" are found in herds of pure-bred cattle on account of the great financial losses which may follow unnecessary publicity.

He suggested that such matters be handled by the proper authorities without advertising the breeders' misfortunes.

Officers of the State Association for the year ending July, 1920, are as follows: President, W. H. Martin, El Reno; Vice-President, W. P. Shuler, Oklahoma City; Secretary, D. W. Gerber, Oklahoma City; Treasurer, C. H. Hooker, Vinita.

J. S. GROVE.

WESTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION.

The summer meeting of the Western Michigan Veterinary Medical Association was held June 25th, 1919, at Grand Rapids, Mich., with a clinic in the forenoon at Dr. M. E. Elzinga's hospital. The lunch, afternoon session outing, etc., was held at Manhattan Beach, Reed's Lake.

This meeting was one of the largest and best ever held by the association.

O. H. VAN BRUSSEL, *Sec.-Treas.*

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION.

The tenth annual meeting of the Central New York Veterinary Medical Association was held at Syracuse on June 26, 1919. The business meeting was held at the St. Cloud Hotel, opening at 3:45 P. M., with a good attendance present.

The meeting was called to order by President J. M. Currie and the following members answered the roll call:

Drs. W. G. Hollingsworth	Drs. W. B. Switzer
J. A. Pendergast	J. M. Currie
E. E. Cole	A. J. Tuxill
E. E. Dooling	Frank Morrow
W. L. Clark	A. E. Merry
C. R. Baldwin	W. M. Pendergast

J. C. Stevens	J. V. Townsand
J. K. Bosshart	M. W. Sullivan
A. L. Danforth	D. A. Boardman
W. M. Long	J. H. Stack

HONORARY MEMBERS.

Dr. V. A. Moore Dr. Otto Faust

The minutes of the previous meeting were read by the Secretary and were approved and ordered placed on file.

The entertainment committee reported that at the last minute they had been unable to find a suitable place to hold a clinic. On motion duly seconded, Drs. J. A. Pendergast and E. E. Dooling were appointed a committee to arrange to secure a suitable place for holding clinics in the future.

It was further moved and seconded that the President appoint a committee to look into the matter of purchasing an operating table for the use of the association, if one could be had at a reasonable price. Drs. Pendergast and Dooling were also appointed on this committee.

An interesting discussion arose in regard to the illegal practitioner; and while it showed that some work had been done, it also showed that there were plenty of violations at the present time.

The President now called for reports of officers, and at this point he was asked to deliver his annual address, which was very interesting and much enjoyed.

The Secretary's report was read and received; and that of the Treasurer was accepted and ordered to be handed to the auditing committee.

The auditing committee reported favorably on the Treasurer's report, and it was ordered placed on file.

The question of members three years in arrears with their dues was taken up, and it was moved and seconded that the Secretary communicate with all such members, and if they then failed to meet their obligations they should be suspended.

The election of officers for the ensuing year resulted as follows: President, Dr. W. L. Clark, Seneca Falls; Vice-President, Dr. A. J. Tuxill, Auburn; Secretary-Treasurer, Dr. W. B. Switzer, Oswego. The acting Censors were reëlected for another year.

A paper on Difficult Parturition, by Dr. W. L. Sullivan, and one by Dr. J. H. Stack, on Lympho-Carcinoma, were presented,

both of which were very interesting and instructive, and provoked a good discussion. Then followed a general discussion on Torsion of the Uterus.

This being the tenth anniversary of the association, a little extra entertainment had been planned by the committee.

The members adjourned to the dining room of the St. Cloud Hotel where an excellent banquet took place, many of the wives and lady friends being present. After the banquet, adjournment was made to the meeting room, where the ladies participated in the pleasure of listening to the instructive addresses delivered by Mr. A. L. Brockway of Syracuse, and Prof. V. A. Moore, Director of the New York State Veterinary College at Cornell University. Dr. Moore's subject was the Physical Examination of Cows, and Mr. Brockway spoke along similar lines, both addresses being very interesting.

The association adjourned until November, and there was a general feeling that no one could afford to miss the meetings of the society.

W. B. SWITZER, *Secretary.*

TO OUR VETERINARY ROTARIANS.

ROTARY

(An Acrostic)

Rally, brothers, to *The Wheel,*
Our *Emblem* of desire
To make things better than they were,
And serve as to inspire;
Remembering *Service,* only, aids our brothers
in life's race;
Yet *Self* will ofttimes forge in front, should
Service yield the pace.

W. H. D.

Captain Eddell C. Jones has received his discharge from the Army and has resumed practice at Gothensburg, Nebraska. Captain Jones has been stationed at Camp Greenleaf as post veterinarian for the past six months.

Dr. G. E. Ellis, Baton Rouge, La., has been transferred by the Bureau to Washington, D. C.

COMMUNICATIONS.

Lieut. E. Lapple, V. C., writes interestingly from Montabaur, Germany, although previous to the signing of peace.

Journal A. V. M. A.:

I take great pleasure in writing after my arrival in the 1st from the 90th Division. We are now located in the Rhine River region and don't know when peace terms will be signed, so we may get back again to the good old U. S. A., but let us all hope this may be before the snowflakes fall, as we have all seen enough on this side, and after an absence of a year or more from the dear ones in America, we may be taken back to the "Land of Liberty," where a language is spoken we can all understand. Our speaking in France and Germany is done mostly by the hand method and is hard to understand.

The Journals have been more than interesting to me, as I have no textbooks for reference, and often find time to read all that is contained in them, now that we are out of combatant lines.

The country of Germany is beautiful, and the hillsides all along the Moselle and Rhine rivers are more than beautiful, castles being seen commonly, and they are real good pastime to look into, as quite a few of them contain the bones of individuals who have died many years ago.

The latest information we have is that only 120,000 animals remain in the A. E. F., and we all know they will be disposed of as soon as the Germans sign peace terms.

The Germans are anxious to secure American animals, both for work and eating purposes, as they all use cows in wagons to haul their stable manure to the fields; and some of them use dog teams to make purchases when their back-bags don't accommodate the purchased articles.

As I have no more of interest to say, and feel that it is a pleasure to write in the interest of THE JOURNAL, I beg to close, hoping to see my brother veterinarians at the A. V. M. A. in November.

LIEUT. E. LAPPLE, Vet. Corps.

Dr. J. P. Bushong has severed his connection with the Lederle Antitoxin Laboratories and is now with the Cutter Laboratories at Berkeley, Calif.

NECROLOGICAL.

LIEUT. J. D. LEE.

Lieut. Jeptha D. Lee, a member of the A. V. M. A., died in France about the 1st of March, from an acute attack of pneumonia.

Lieut. Lee was born in Mukwonago, Wis., September 7, 1877. He received his early education there, and later entered Carroll College.

In 1898 he served with Company A, 4th Wis. Vol. Inf., during the Spanish-American War. The year following he entered Marquette University and studied dental surgery. Ill-health at the time forced him to make a change in his choice of professions, and his love for animals made veterinary science his second choice. He graduated from the Ontario Veterinary College with honors in 1907; opened a modern veterinary hospital in Menominee, and enjoyed a large practice, and where his loss is keenly felt throughout the entire community.

Lieut. Lee was one of the first, if not the first, Wisconsin veterinarian to offer his services to his country. He applied for his commission on April 12th, 1917; received it in June, and was called to active service in September. He was assigned to duty with the 111th Train Headquarters and Military Police of the 36th Division, then in training at Camp Bowie, Fort Worth, Texas. He went overseas in June, 1918; served at the front from October 9th until hostilities ceased, with the 111th Sanitary Train, and later was transferred to the 133rd Machine Gun Battalion, 36th Division. Lieut. Lee's loyalty and devotion to duty won him the respect and love of both officers and men.

Lieut. Lee was a member of the historic Lee family.

MISCELLANEOUS.

HUNS DEMAND PEDIGREES OF HORSES STOLEN IN BELGIUM.

Let me commend the following occurrence to the notice of Major August Belmont, of the Jockey Club, in New York, and to that of all the principal clubs and organizations which have at heart the welfare of that king of all sports, horse-racing:

In one of my former letters I described how when the Germans invaded Belgium they looted all the blooded stock upon which they could lay hands. Indeed, only about a quarter of the racing studs in the kingdom escaped seizure by being hurried over the borders into Holland and into France.

But the Germans were unable to secure possession of the pedigrees of the horses thus stolen, and were so infuriated thereby that they deported into Germany the official starter of the Belgian Jockey Club, an Englishman.

In the belief that he either knew the pedigrees or could be instrumental in obtaining them, the man was alternately cajoled and subjected to the most inhuman treatment, all, however, without avail. Today he is a physical wreck.

But what is more amazing still is that although Germany was supposed to have released all entente interned prisoners within a few weeks following the signing of the armistice in the first days of November, the starter is still a prisoner in Germany.

HELD FOR RANSOM.

Worse still is the fact that the Union Club of Berlin, which is the German counterpart of the Jockey Club in England and in France, indeed, for 60 years past the premier social and sporting club of all Germany, has addressed a communication to the Belgian Jockey Club admitting the fact that the starter is still detained in Teuton captivity and quite shamelessly demanding as a condition of his liberation that the pedigrees of the blooded stock stolen from Belgian stud farms and racing stables should be surrendered to the club.

Moreover, one of the principal officers of the Union Club, one of the numerous Princes Hohenlohe, has sent an independent letter to the secretary of the Belgian Jockey Club offering his per-

sonal influence in securing the liberation of the starter and his return to Belgium if the secretary would be so good as to obtain for him — that is to say, for the writer — the pedigree of a particularly beautiful mare which he had carried off from Belgium.

WARNED OFF THE TURF.

These are not matters of mere gossip, but of actual record. They have been communicated by the Jockey Club of Belgium to the jockey clubs in Paris and in London, and have resulted in a unanimously adopted resolution barring the entry of all horses owned by the Huns and by their Austrian and Hungarian allies, and warning German owners, German trainers and German jockeys off the British and French turf.

The ban will apply equally to any English or French trainers or jockeys who may remain in Teuton employ or who may take service in Germany or Austria. It is up to the various racing organizations in the United States to follow suit. Racing is based on the observance of certain ethics of honor. Without these ethics clean sport is impossible, and in the late war the Germans have shown in a thousand different ways that they do not consider any laws of honor as binding.—*Washington Post, June 18, 1919.*

OKLAHOMA NOTES.

Dr. Leroy B. Fox has returned from several months' sojourn among the Indians in the vicinity of Kearn's Canyon, Arizona. He reports that the natives are not entirely in sympathy with the efforts of the B. A. I. to eradicate dourine from their horse stock, although about 4 per cent of the animals handled were found to be infected.

Dr. H. H. Kettler, formerly with the B. A. I. at Fort Worth, Texas, and more recently with the Army Veterinary Corps, has been reinstated on the meat inspection force at Oklahoma City.

Dr. L. D. Barber, State agent for the Purity Serum Co., has opened an office at the Oklahoma National Stock Yards.

Dr. C. H. Reid entered the service of the State as a Deputy State Veterinarian July 1st. He will devote most of his time to tuberculosis eradication.

Dr. Roy C. Smith has resigned his position as dairy inspector in Enid and accepted an appointment as Deputy State Veterinarian on July 1, 1919.

Dr. Fred S. Molt, Veterinary Inspector, is recovering from a very severe attack of malaria.

Dr. H. W. Ayres, who has been with the Army Veterinary Corps at Camp Upton, N. Y., for nearly a year, has finally secured his discharge and returned to Oklahoma City June 27th.

J. S. GROVE, *Resident State Secretary.*

EXHIBITION OF THE MEDICAL DEPARTMENT, U. S. ARMY, AT CONVENTION OF AMERICAN MEDICAL ASSOCIATION, ATLANTIC CITY, N. J.

JUNE 9 TO 14, 1919.

VETERINARY DIVISION

This comprised a series of types of chests of articles used in this service and charts, maps and photographs showing its work in the care of horses and mules. Charts were presented showing the non-effective and death rates among horses and mules for the American expeditionary forces and in the United States, and also the death rate from glanders. Phases of the inspection and transportation of meat and meat food products were also shown in photographs. Types of chests shown were: Those issued to veterinary hospitals containing surgical instruments, to hospitals of capacity of 1,000 animals, with contents, those containing miscellaneous veterinary supplies as issued to hospitals; those containing dental instruments, veterinary field unit chest issued to mobile troops and camp organizations, and field chest issued to each veterinary officer in the field. There was also shown the officer's wallet issued to veterinarians on field duty, and the wallet issued to each farrier.

TICK ERADICATION IN THE SOUTH.

Status of cattle dipping for the month of June, 1919, in the following States:

	Number of dippings.		Number of dippings.
Alabama	994,275	North Carolina	7,589
Arkansas	655,479	Oklahoma	627,572
Florida	275,687	South Carolina	143,641
Georgia	528,409	Texas (North)	1,612,969
Louisiana	1,505,614	Texas (South)	322,359
Mississippi	423,686		